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5	ME-02	REV. 0	60 FOOT ELECTRIC TROLLEY BUS PLAN VIEW
6	ME-03	REV. 0	40 FOOT ORION HYBRID BUS PLAN VIEW
7	ME-04	REV. 0	40 FOOT NEOPLEN BUS PLAN VIEW
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9	ME-06	REV. 0	40 FOOT GILLIG BUS PLAN VIEW
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13	ME-09	REV. 0	ZURICH CAR PLAN VIEW
14	ME-10	REV. 0	HERB CAEN CAR PLAN (130 SPECIAL) VIEW
15	ME-11	REV. 0	PCC (1070) CAR PLAN VIEW
16	ME-12	REV. 0	MILAN (1815) CAR PLAN VIEW
17	ME-13	REV. 0	NEW ORLEANS (952) CAR PLAN VIEW
18	ME-14	REV. 0	PCC (1015) DOUBLE ENDED CAR PLAN VIEW
19	ME-15	REV. 0	PCC (1063) CAR PLAN VIEW
20	ME-16	REV. 0	MELBORNE (496) PLAN VIEW

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21	ME-17	REV. 0	LIGHT RAIL VEHICLE PLAN VIEW
CABLE CARS			
22	ME-18	REV. 0	CABLE CAR (Powell St.) PLAN VIEW
23	ME-19	REV. 0	CABLE CAR (California St.) PLAN VIEW
NON-REVENUE			
24	ME-20	REV. 0	SEDAN
25	ME-21	REV. 0	PICKUP
26	ME-22	REV. 0	FREIGHTLINER
27	ME-31	REV. 0	VAN
DIGITAL VISUAL AND AUDIO SYSTEM			
28	SYS-09	REV. 0	DVAS AND INTERFACES OVERVIEW SINGLE CAR ARRANGEMENT
29	SYS-10	REV. 0	DVAS AND LONWORKS INTERFACE OVERVIEW SINGLE CAR AND COUPLED CARS ARRANGEMENT
30	SYS-11	REV. 0	DVAS PUBLIC ADDRESS INTERFACE OVERVIEW SINGLE CAR AND COUPLED CARS ARRANGEMENT
31	SYS-12	REV. 0	WIRELESS BULK DATA TRANSFER SUBSYSTEM AND INTERFACES OVERVIEW
32	SYS-13	REV. 0	EXISTING CAB COMMUNICATIONS EQUIPMENT ARRANGMENT OVERVIEW

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REVISIONS

DESIGNED R. GAVE
DRAWN J. LIO
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REVIEWED
RECOMMENDED
APPROVED
DATE 11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

INDEX OF DRAWINGS (pg. 1)

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DWG. NO. G-01
REVISION
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REV. 0

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34	CV-03	REV. 0	TYPICAL DETAILS RACK BRACING

BERNAL HEIGHTS

35	G-04	REV. 0	COVER SHEET
36	AR-01	REV. 0	SITE PLAN
37	EL-01	REV. 0	SITE ELECTRICAL
38	EL-02	REV. 0	SITE GROUNDING
39	ME-28	REV. 0	ANTENNA DETAILS
40	ME-26	REV. 0	MECHANICAL PLAN
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42	G-05	REV. 0	COVER SHEET
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45	DRAWING HAS BEEN DELETED		
46	ME-25	REV. 0	MECHANICAL PLAN
47	EL-13	REV. 0	ELECTRICAL EXISTING CONDITIONS
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50	G-06	REV. 0	COVER SHEET
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55	AR-08	REV. 0	FINAL CONTROL ROOM PLAN
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57	G-07	REV. 0	COVER SHEET
58	AR-09	REV. 0	SITE PLAN AND ELEVATIONS
59	AR-10	REV. 0	ROOM LAYOUT AND ELEVATIONS
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62	EL-06	REV. 0	SITE GROUNDING
63	ME-24	REV. 0	MECHANICAL PLAN
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RADIO SYSTEM REPLACEMENT PROJECT

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DWG. NO. G-02
REVISION REV. 0
SHEET NO. 2

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66	CV-01	REV. 0	SITE PLAN
67	AR-11	REV. 0	SHELTER PLAN
68	EL-07	REV. 0	SITE ELECTRICAL
69	EL-08	REV. 0	SITE GROUNDING
70	ME-23	REV. 0	MECHANICAL PLAN
71	EL-17	REV. 0	ELECTRICAL EXISTING CONDITIONS
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72	G-09	REV. 0	COVER SHEET
73	AR-12	REV. 0	SITE PLAN
74	EL-09	REV. 0	POWER
75	EL-10	REV. 0	SITE GROUNDING
76	ME 29	REV. 0	ANTENNA DETAILS
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80	SYS-05	REV. 0	EQUIPMENT CONFIGURATIONS
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RADIO SYSTEM REPLACEMENT PROJECT

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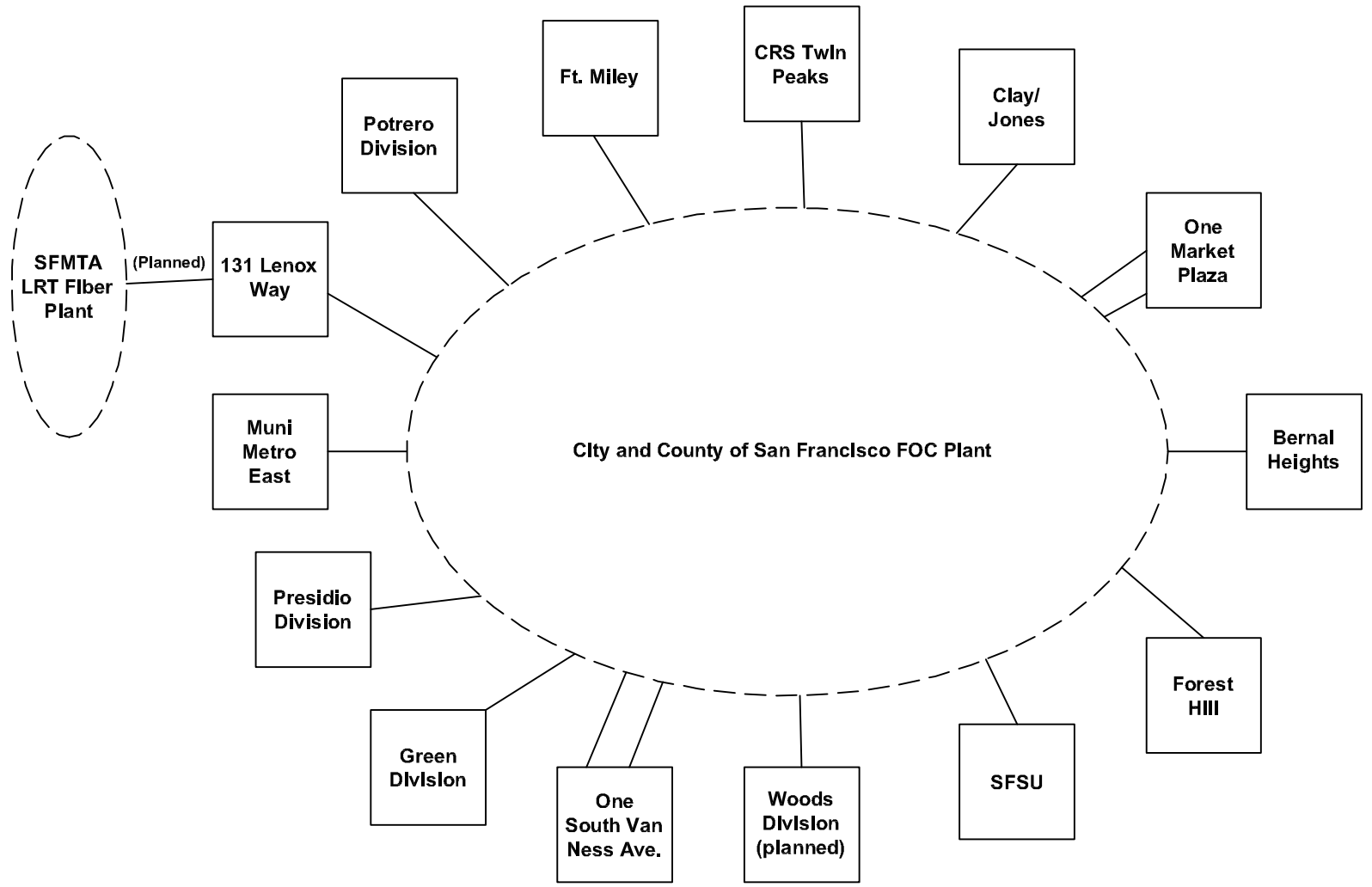
DWG. NO. G-03
REVISION REV. 0
SHEET NO. 3



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RADIO SYSTEM REPLACEMENT PROJECT

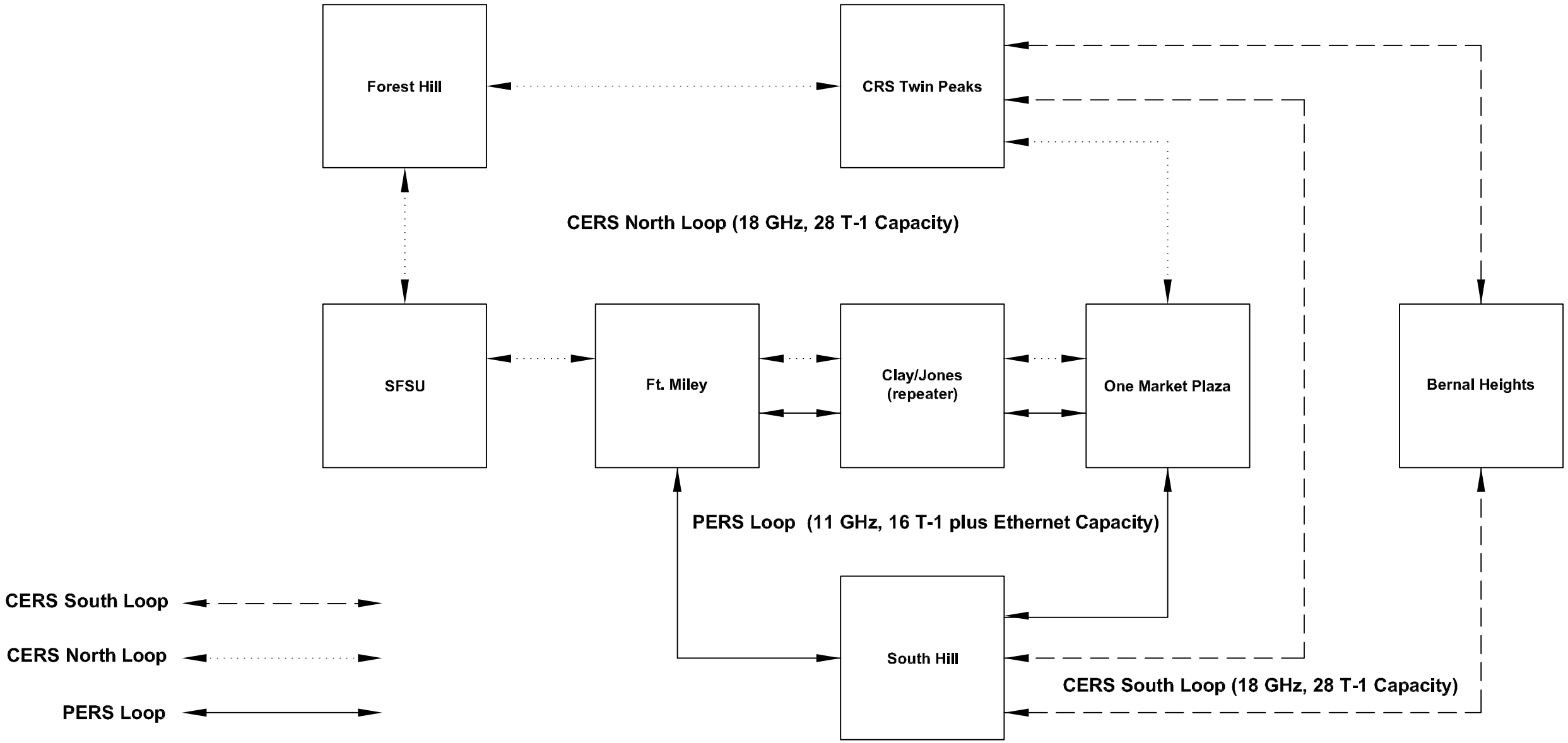
Existing CCSF FOC
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. SYS-01

REVISION REV. 0

SHEET NO. 87



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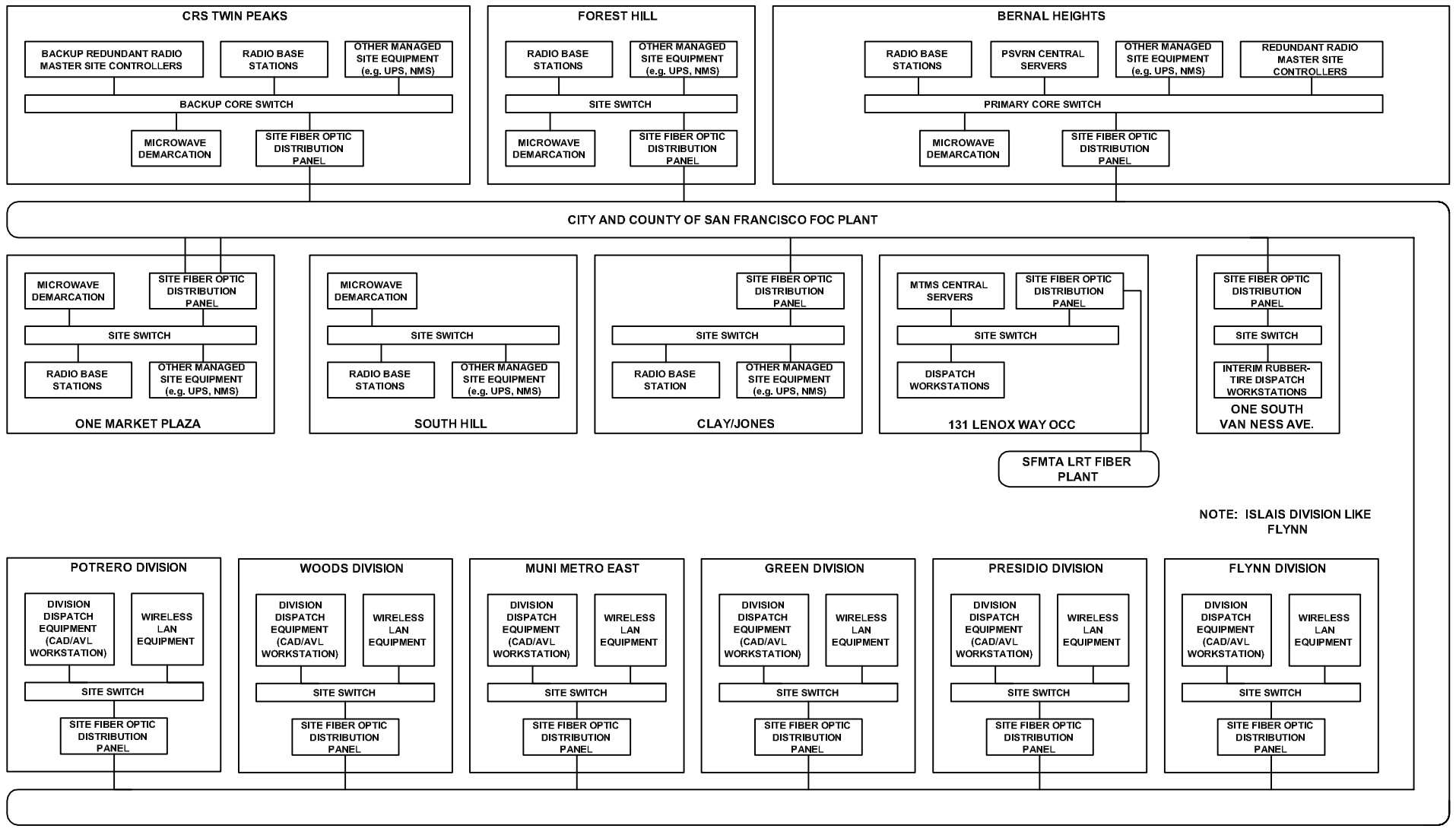
RADIO SYSTEM REPLACEMENT PROJECT

Existing CCSF MW Backhaul
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO.	REVISION
SYS-02	REV. 0
SHEET NO.	
88	



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RADIO SYSTEM REPLACEMENT PROJECT

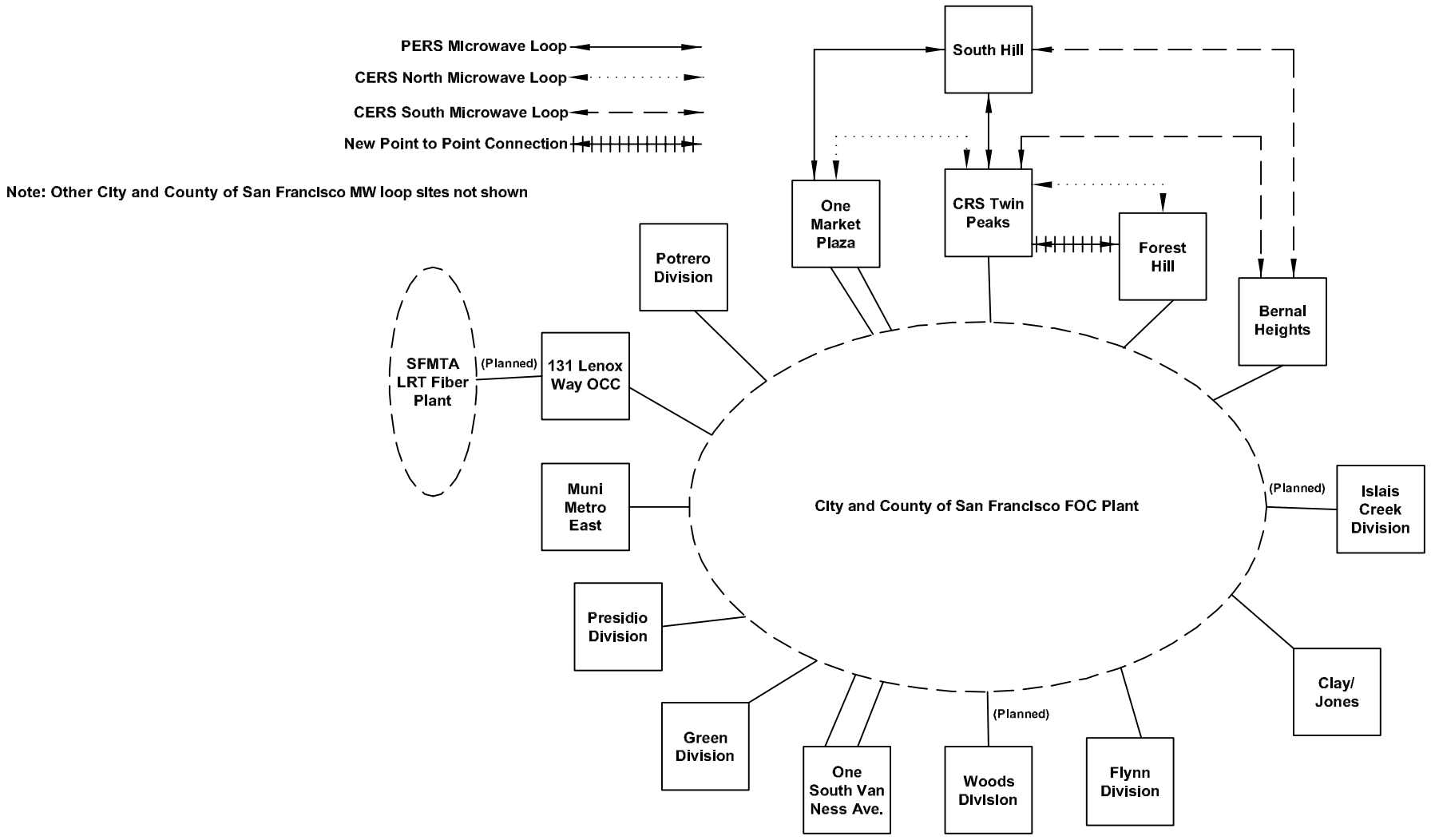
Network Architecture
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. SYS-03

SHEET NO. 89

REVISION REV. 0



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MUNICIPAL TRANSPORTATION AGENCY

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for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

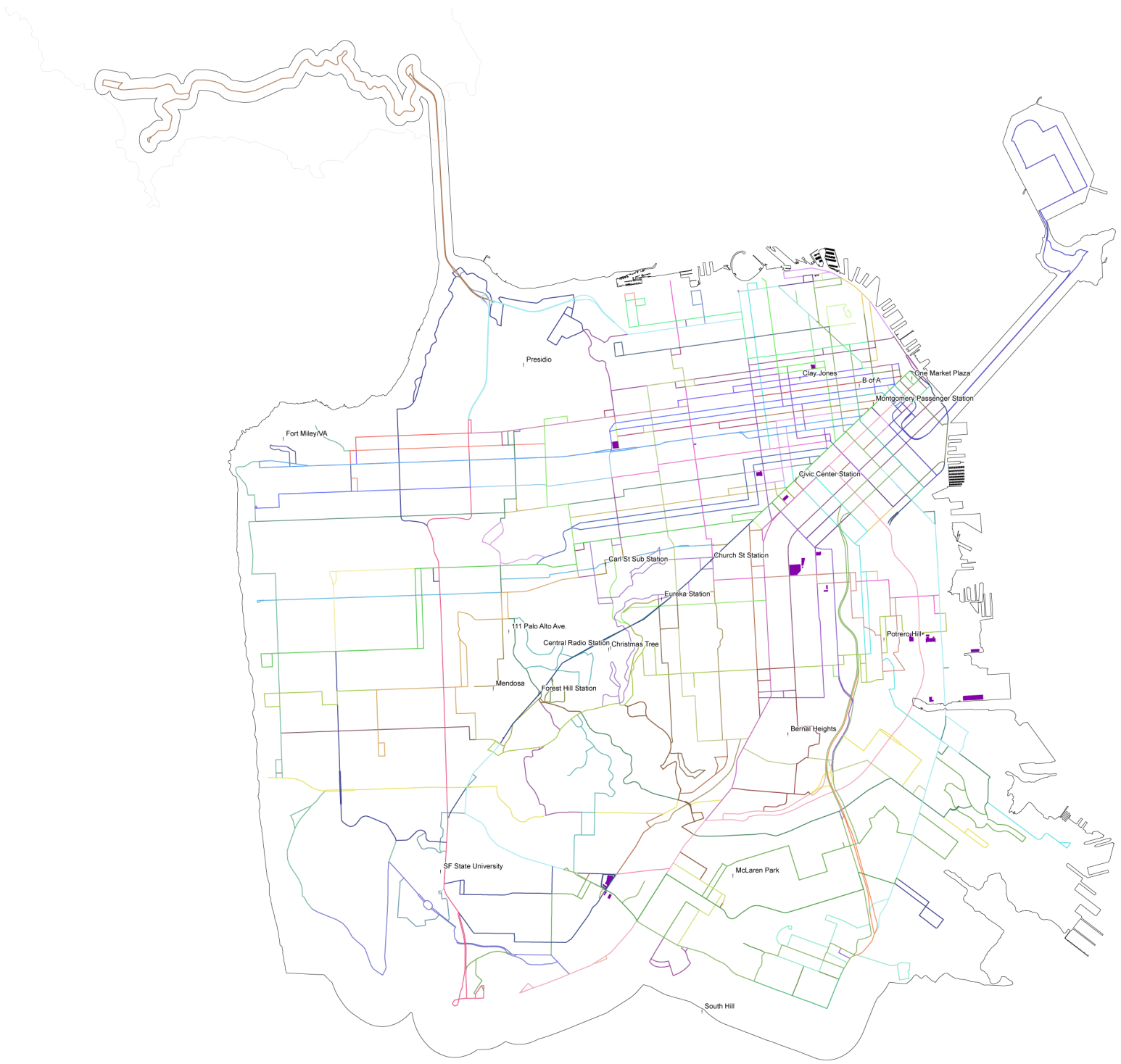
PSVRN–MTMS MW and FOC Topology
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. SYS–04

SHEET NO. 90

REVISION REV. 0



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RADIO SYSTEM REPLACEMENT PROJECT

Geographic Service Area
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

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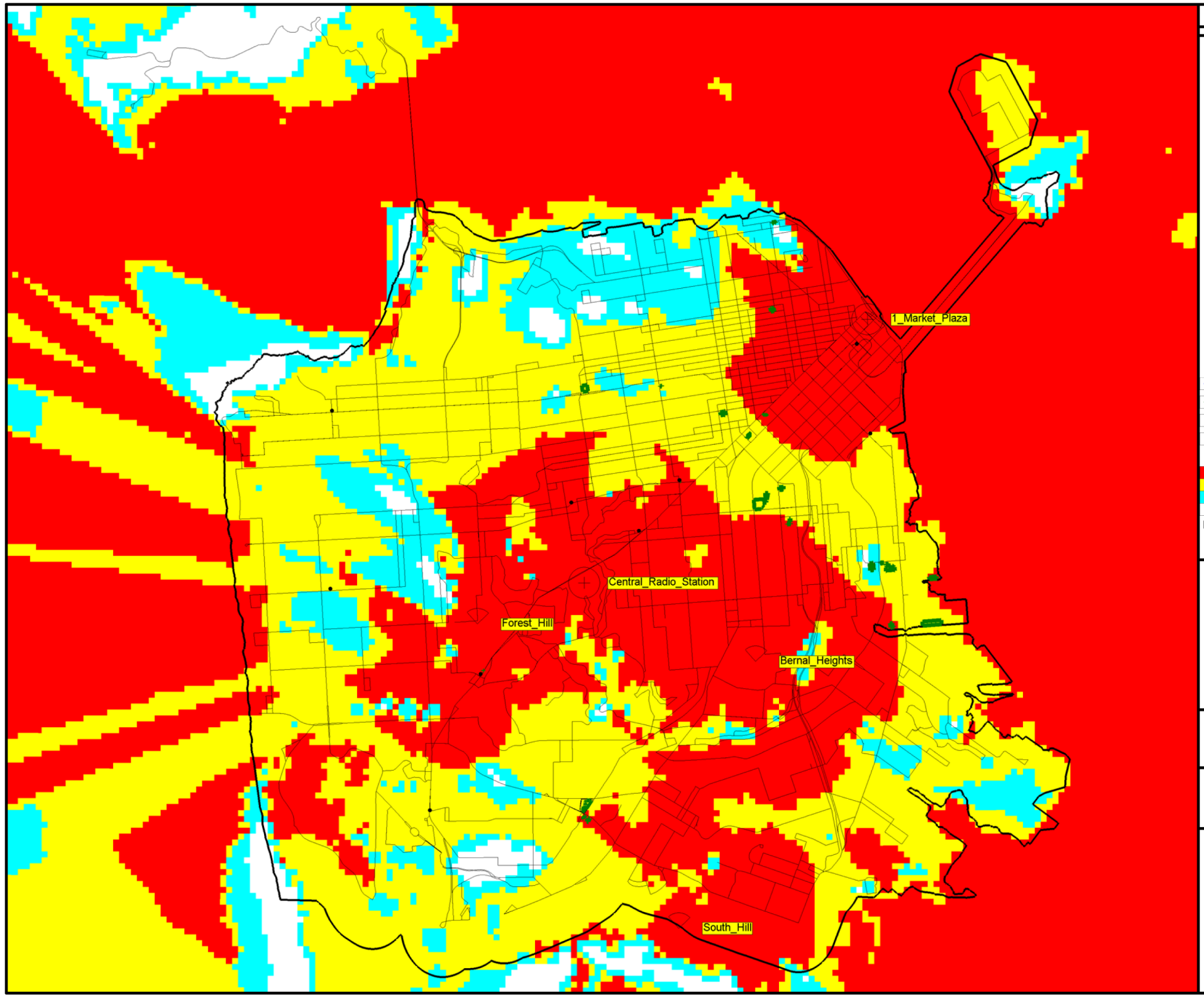
DWG. NO.	REVISION
SYS–06	REV. 0
SHEET NO. 84	



MSITE™: SFMTA Planned 700 MHz 4-23-09

Sites

Site: 1_Market_Plaza
N37°47'36.12" W122°23'39.66" 6.6 ft
MPZA700 Tx.Ht.AGL: 589.9 ft Total ERPd: 50.55 dBmW
Model: 2 omni-vertical/0.0° 799.0000 MHz

Site: Bernal_Heights
N37°44'35.10" W122°24'54.00" 455.7 ft
BHTS700 Tx.Ht.AGL: 70.9 ft Total ERPd: 50.55 dBmW
Model: 2 directional-vertical/0.0° 799.0000 MHz

Site: Central_Radio_Station
N37°45'16.74" W122°26'47.88" 850.5 ft
CRS700 Tx.Ht.AGL: 190.0 ft Total ERPd: 50.55 dBmW
Model: 2 omni-vertical/0.0° 799.0000 MHz

Site: Forest_Hill
N37°44'55.00" W122°27'59.00" 720.1 ft
FRHIL700 Tx.Ht.AGL: 86.9 ft Total ERPd: 50.55 dBmW
Model: 2 directional-vertical/0.0° 799.0000 MHz

Site: South_Hill
N37°42'14.00" W122°25'45.00" 659.4 ft
SOHIL700 Tx.Ht.AGL: 40.0 ft Total ERPd: 50.55 dBmW
Model: 2 directional-vertical/0.0° 799.0000 MHz

Problem Areas
Muni Properties
Coverage Area A
Muni Routes

Received Power at remote

>	-74.4 dBmW	Reliable Veh. & In-Veh. Port. (standing)
-85.0 to	-74.4 dBmW	Reliable Vehicle and Outdoor Portable
-108.9 to	-85.0 dBmW	Reliable Vehicle / Unreliable Portable
<	-108.9 dBmW	Unreliable Vehicle / Unreliable Portable

Display threshold level: -108.9 dBmW
RX Antenna - Type: OMNI
Height: 5.9 ft AGL Gain: -1.50 dBd

Notes

Vehicular Transmit Power: 30 watts
Vehicular Antenna System Gain: -1.5 dB
Portable Antenna Type: 1/2 wave 6.5", swivel case, hip; head
Portable Antenna Gain + Body Loss: - 12.4 dB
Portable Transmit Power: 3 watts
Average Vehicle Loss (if applicable): 10 dB
Reliability Displayed: 95%
Delivered Audio Quality (DAQ): 3.4
Wireless Technology: Project 25 / TIA-102 Phase 1 Digital
Simulcast Capture Ratio (if applicable): 20 dB

MILES
-1 0 1

Alternative 8A

Talk-In (Uplink) 700 MHz System P25 Ph I

April 23, 2009

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED

REVISIONS

DESIGNED	G. Forrest
DRAWN	J. LIO
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REVIEWED	
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APPROVED	
DATE	10/01/2009

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RADIO SYSTEM REPLACEMENT PROJECT

Portable Talk-In Coverage
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
SYS-07	REV. 0
SHEET NO. 85	

NOTES:

1. THERE'S TOTALL EIGHT SUBTERRENEAN VALVES FOR CABLE CAR MACHINERY. THE RADIO COVERAGE IS REQUIRED IN THESE VALVES.
2. CABLE CAR BARN WHICH IS NUMBER 1 LOCATION ON THE MAP. INBUILDING COVERAGE IS REQUIRED FOR THIS LOCATION.

CABLE CAR MACHINERY MAINTENANCE VALVE LOCATION

NTS

1. CABLE CAR BARN
2. CALIFORNIA & DRUMM
3. CALIFORNIA & MASON
4. CALIFORNIA & HYDE
5. HYDE & PACIFIC
6. POWELL & MARKET
7. VICTORIAN PARK
8. BAY & TAYLOR
9. OPERATION CONTROL CENTER

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED

REVISIONS

BORDER REVISED 11/17/05

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RECOMMENDED
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DATE

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RADIO SYSTEM REPLACEMENT PROJECT

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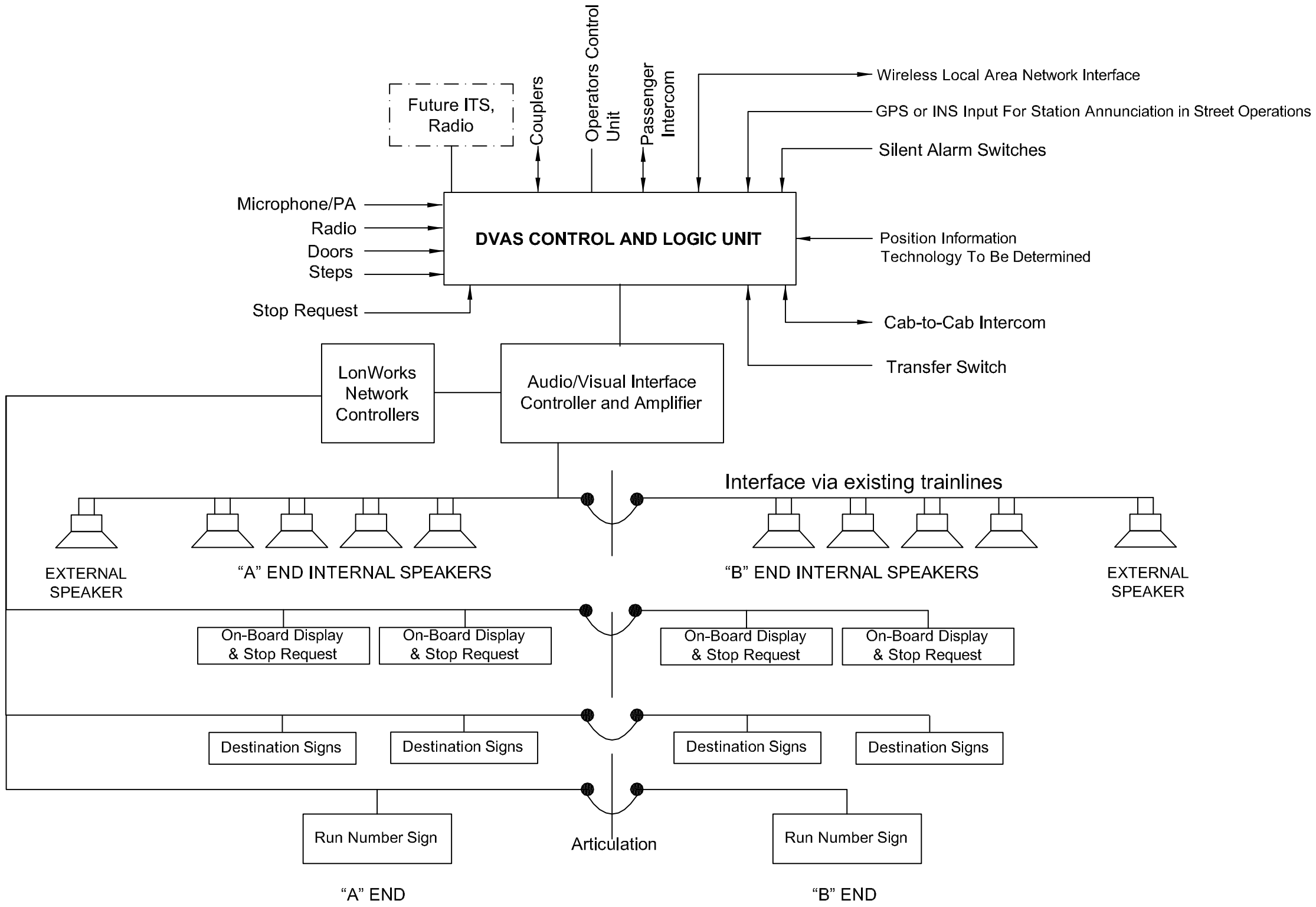
CABLE CAR MACHINERY RADIO COVERAGE MAP

DWG. NO. SYS-08
SHEET NO. 86
REVISION 0



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REGISTERED PROFESSIONAL ENGINEER ROBERT GAVE E 17042 EXP 9/30/11 ELECTRICAL STATE OF CALIFORNIA

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DATE	11/18/2009

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RADIO SYSTEM REPLACEMENT PROJECT

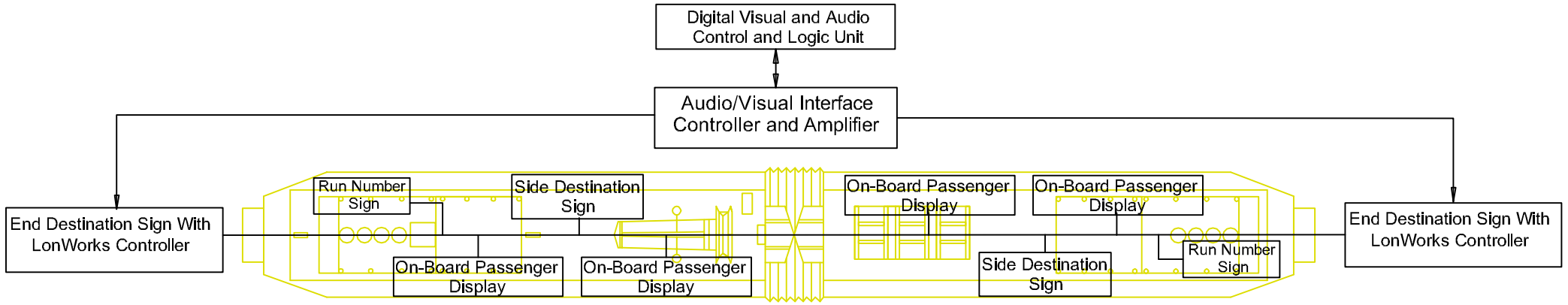
DIGITAL VISUAL AND AUDIO SYSTEM AND INTERFACES OVERVIEW
SINGLE CAR ARRANGMENT
(CONCEPTUAL REFERENCE ONLY)

1240

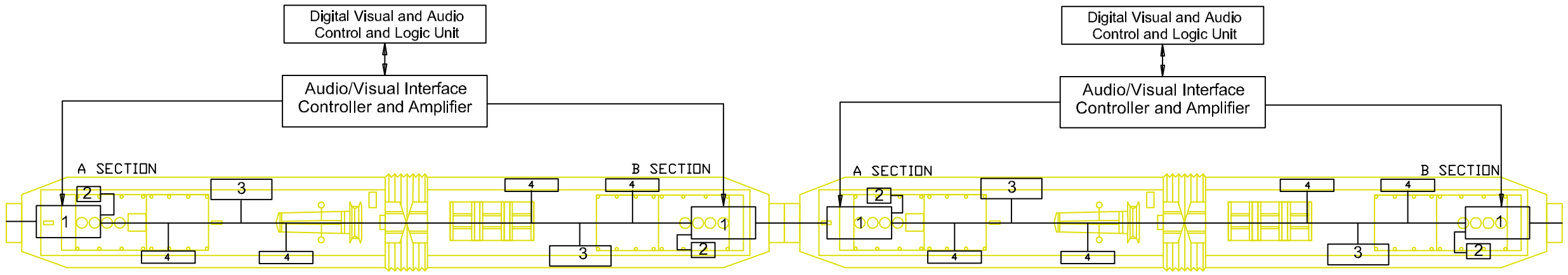
DWG. NO. SYS-09

REVISION REV. 0

SHEET NO. 28


Digital Visual and Audio Control and Logic Unit
Audio/Visual Interface Controller and Amplifier
End Destination Sign With LonWorks Controller
Run Number Sign
Side Destination Sign
On-Board Passenger Display
On-Board Passenger Display
On-Board Passenger Display
On-Board Passenger Display
Side Destination Sign
Run Number Sign
End Destination Sign With LonWorks Controller

SINGLE CAR PLAN VIEW



COUPLED CARS PLAN VIEW

Legends:
1. Existing end destination signs and LonWorks controllers
2. Existing run number signs
3. Existing side destination signs
4. New on-board passenger displays

Notes:
1. Drawing not to scale
2. The Digital Visual and Audio System shall function in any combination of coupling including A end to A end, A end to B end, B end to B end
3. All equipment and interfaces are vehicle-borne

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RADIO SYSTEM REPLACEMENT PROJECT

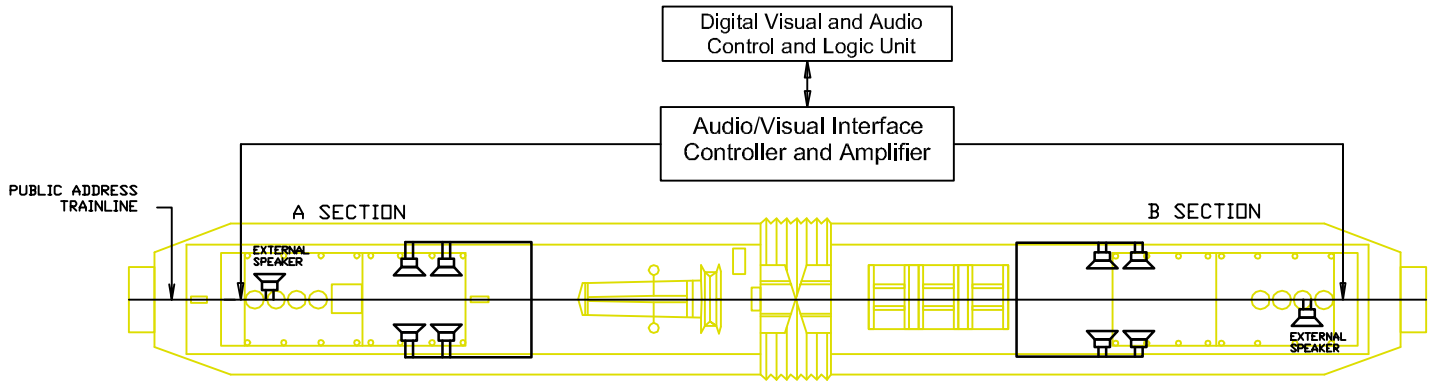
DIGITAL VISUAL AND AUDIO SYSTEM
AND LONWORKS INTERFACE OVERVIEW
SINGLE CAR AND COUPLED CARS ARRANGEMENT
(CONCEPTUAL REFERENCE ONLY)

1240

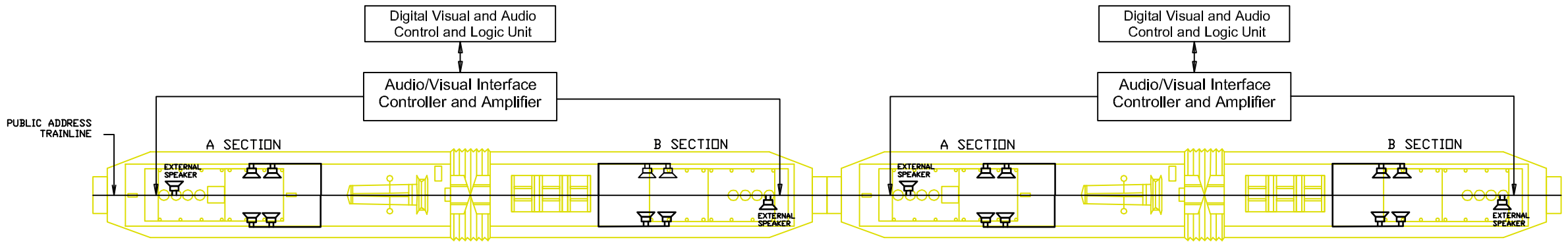
DWG. NO. SYS-10

REVISION REV. 0

SHEET NO. 29



SINGLE CAR PLAN VIEW



COUPLED CAR PLAN VIEW

Notes:
1. Drawing not to scale
2. The Digital Visual and Audio System shall function in any combination of coupling including A end to A end, A end to B end, B end to B end
3. All equipment and interfaces are vehicle-borne

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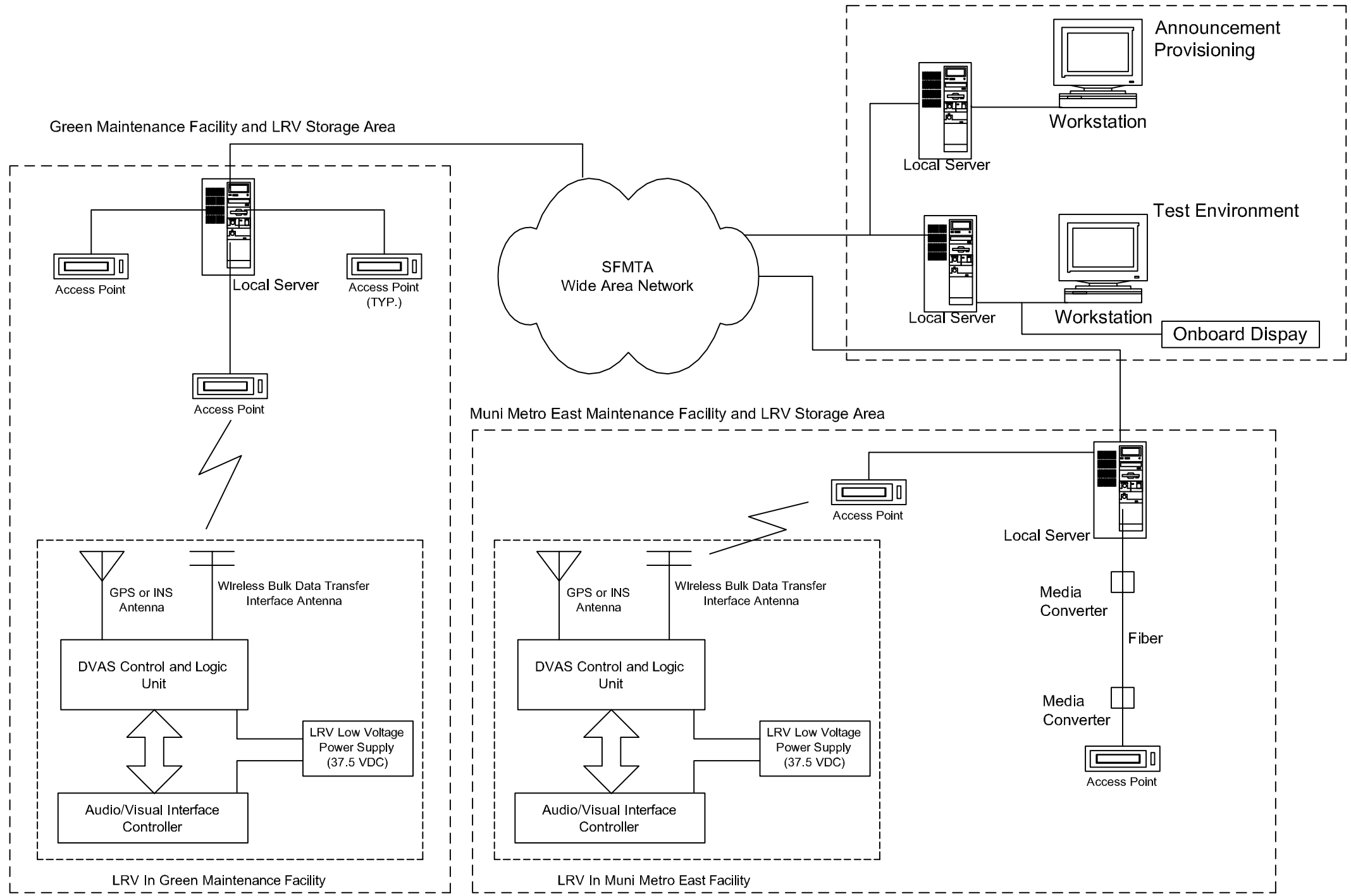
RADIO SYSTEM REPLACEMENT PROJECT

DIGITAL VISUAL AND AUDIO SYSTEM
PUBLIC ADDRESS INTERFACE OVERVIEW
SINGLE CAR AND COUPLED CARS ARRANGEMENT
(CONCEPTUAL REFERENCE ONLY)

1240

DWG. NO. SYS-11
SHEET NO. 30
REVISION REV. 0



Notes:
1. Arrangement depicts only conceptual subsystem and interfaces. The coverage shall determine the number of access points.
2. The total number of facilities to be equipped with Wireless Bulk Data Transfer Subsystem shall be provided by SFMTA

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
0	11/18/2009	FOR RFQ/RFP ISSUE		JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAVE E 17047 EXP 5/31/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	R. GAVE
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

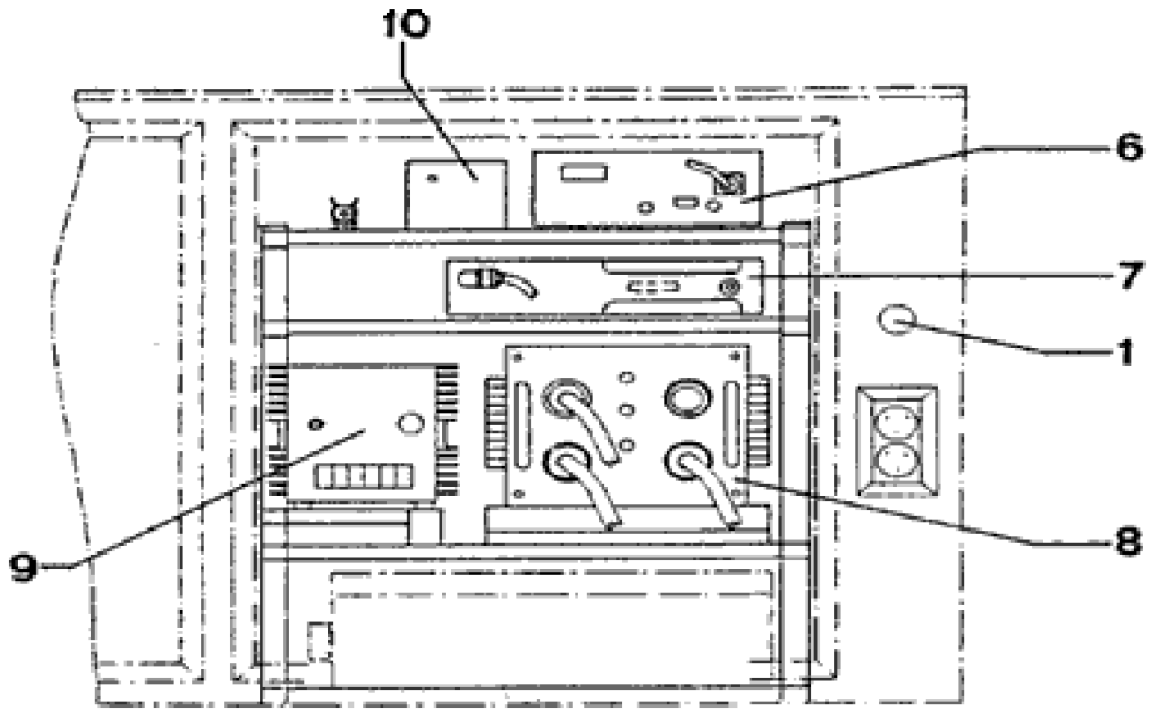
1240

RADIO SYSTEM REPLACEMENT PROJECT

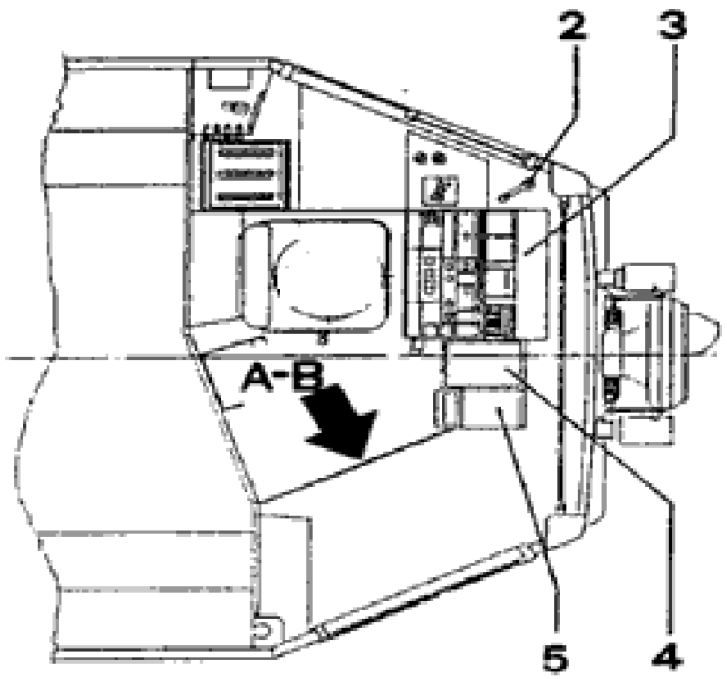
WIRELESS BULK DATA TRANSFER SUBSYSTEM AND INTERFACES OVERVIEW

(CONCEPTUAL REFERENCE ONLY)

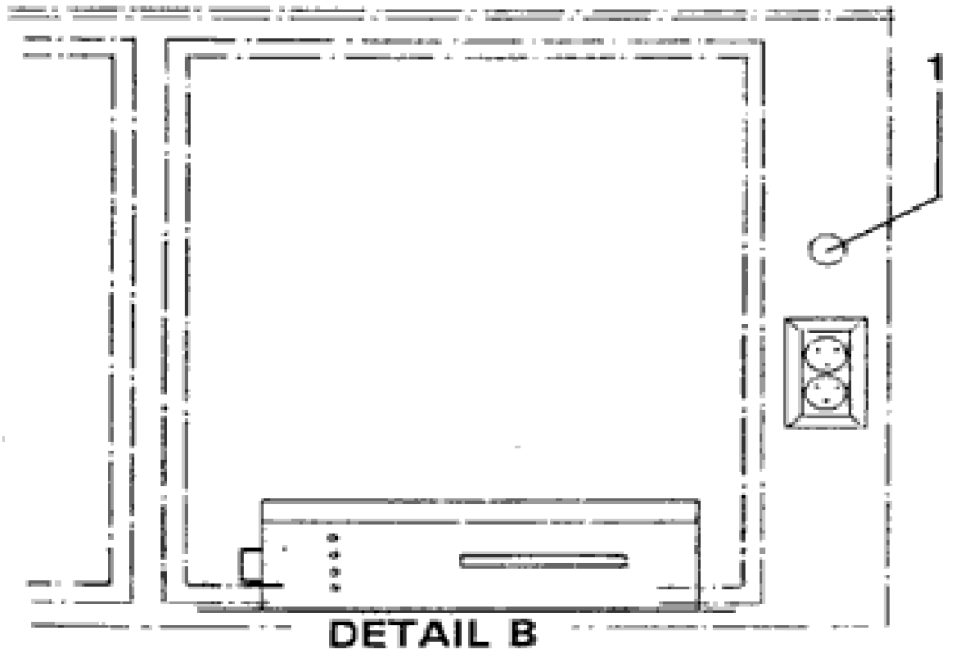
DWG. NO.	REVISION
SYS-12	REV. 0
SHEET NO. 31	



DETAIL A
"A" CAB



OPERATOR CAB



DETAIL B
"B" CAB

1. Sound Powered Phone Jack
2. Gooseneck Microphone
3. Radio Silent Alarm Switch
4. Communication Control Panel
5. Mobile Communication Terminal
6. Location Processing Unit
7. Radio Set
8. Communication Amplifier and Control Unit
9. Radio Power Supply
10. Power Line Filter

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
0	11/18/2009	FOR RFQ/RFP ISSUE		JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAVE E 17047 EXP 3/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	R. GAVE
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

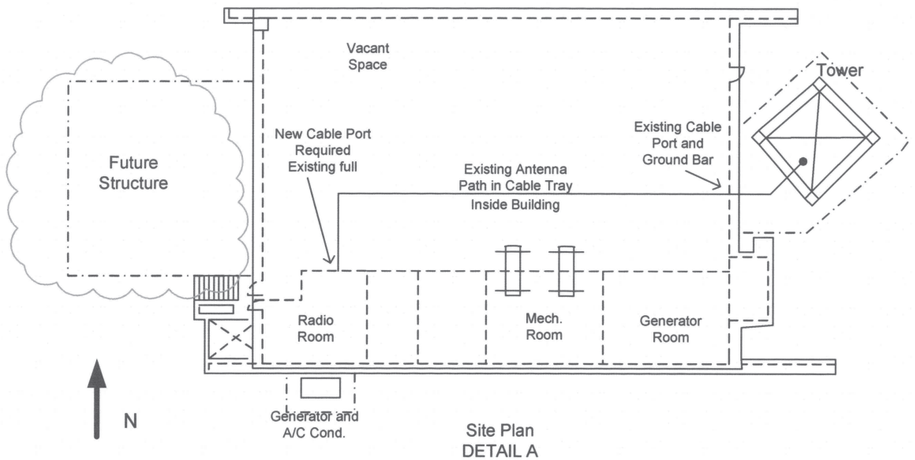
EXISTING CAB COMMUNICATIONS EQUIPMENT ARRANGMENT OVERVIEW
(CONCEPTUAL REFERENCE ONLY)

1240

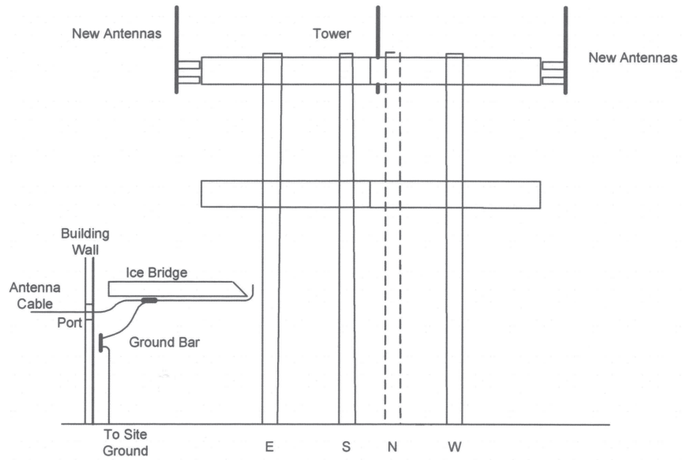
DWG NO. SYS-13

REVISION REV. 0

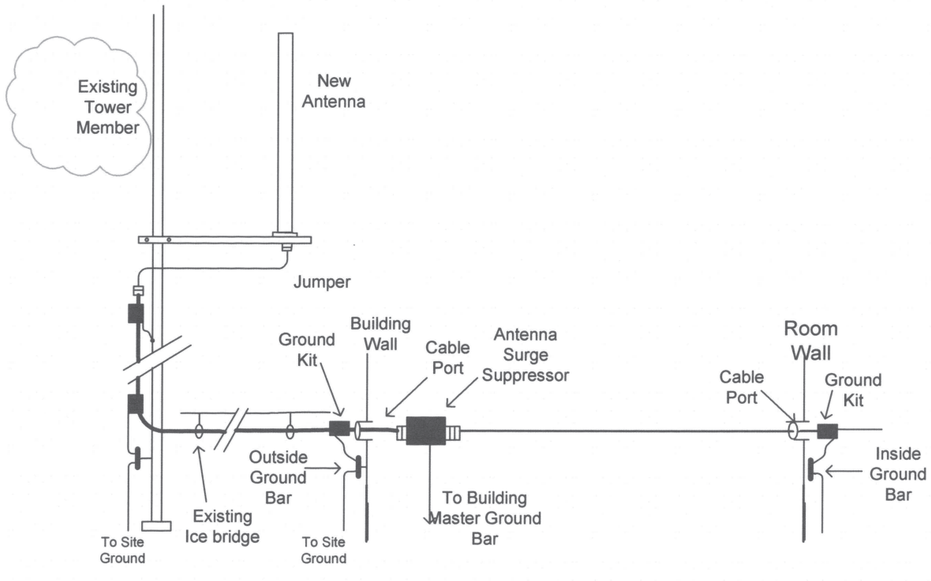
SHEET NO. 32



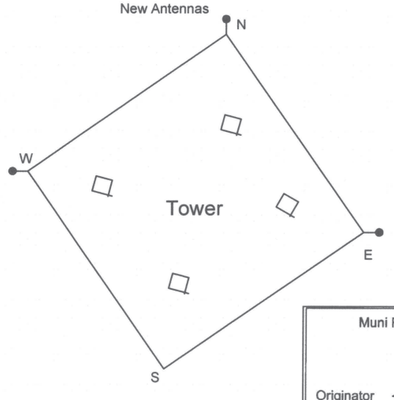
Site Plan
DETAIL A



Tower Elevation
DETAIL B



Antenna Grounding
DETAIL C



Tower Plan
DETAIL D

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Hernan Dec. Mgr	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is correct and accurate and based on best available information at a 35% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/23/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

BERNAL HEIGHTS
ANTENNA DETAILS
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

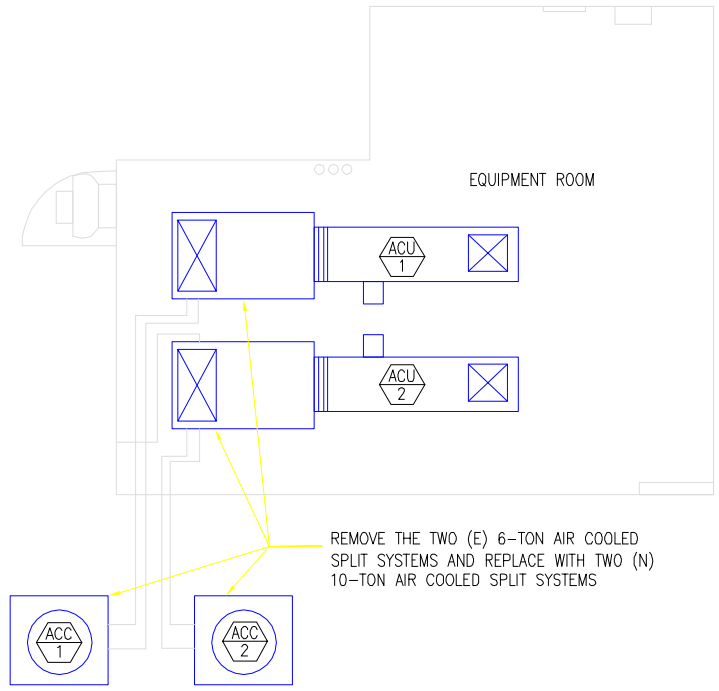
DWG. NO. ME-28
REVISION REV. 0
SHEET NO. 39

LEGEND

1 REFERENCE NOTE

ABBREVIATIONS

\pt0.75;ACC AIR COOLED CONDENSER
ACU AIR CONDITIONING UNIT
BTUH BRITISH THERMAL UNIT PER HOUR
CFM CUBIC FEET MINUTE
DB DRY BULB TEMPERATURE
DBI SF DEPARTMENT OF BUILDING INSPECTION
DDC DIRECT DIGITAL CONTROL
DTIS SF DEPT. OF TELECOMMUNICATIONS & INFORMATION SERVICES
(E) EXISTING
ESP EXTERNAL STATIC PRESSURE
F FAHRENHEIT
FLA FULL LOAD AMPS
HP HORSEPOWER
HZ HERTZ
(N) NEW
NTS NOT TO SCALE
O&M OPERATION AND MAINTENANCE
SCADA SUPERVISORY CONTROL AND DATA ACQUISTION
SF SAN FRANCISCO
SFMTA SF MUNICIPAL TRANSPORTATION AGENCY
V VOLTS
WB WET BULB TEMPERATURE
WG WATER GAUGE


EQUIPMENT ROOM
ACU 1
ACU 2
REMOVE THE TWO (E) 6-TON AIR COOLED SPLIT SYSTEMS AND REPLACE WITH TWO (N) 10-TON AIR COOLED SPLIT SYSTEMS
ACC 1
ACC 2

1 — **EXISTING MECHANICAL FLOOR PLAN**
NTS

NOTES:

1. PRIOR TO SUBMITTAL OF BIDS, CONTRACTOR SHALL VISIT THE JOB TO VERIFY (E) CONDITIONS WHICH IMPACT THE DESIGN, DEMOLITION AND CONSTRUCTION REQUIREMENTS UNDER THIS CONTRACT; AND REVIEW (E) SITE DRAWINGS SF-004-M1 AND SF004-M2 DATED 12/30/97 (REIVSED 1/23/98). THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ITS OWN OBSERVATION AND MEASUREMENTS.
2. THE CONTRACTOR SHALL REMOVE THE TWO (E) CARRIER 6-TON AIR-COOLED SPLIT SYSTEMS AND REPLACE WITH TWO (N) CARRIER 10-TON AIR COOLED SPLIT SYSTEMS. THE (N) EQUIPMENT SHALL BE U.L. LISTED, FACTORY TESTED AND ASSEMBLED.
3. CONTRACTOR SHALL REPLACE AND INSTALL ANY EXISTING PIPING, CONDUITS, EQUIPMENT PAD, SUPPORTS, AND HANGERS REQUIRED TO SUPPORT AND OPERATE THE TWO NEW 10-TON SYSTEMS PER EQUIPMENT MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS, AND THE LATEST CITY AND COUNTY OF SAN FRANCISCO MECHANICAL CODE, BUILDING CODE, AND ELECTRICAL CODE. THE MORE STRINGENT REQUIREMENTS SHALL APPLY.
4. THE CONTRACTOR SHALL MODIFY THE (E) DDC SYSTEM TO MONITOR AND CONTROL THE (N) AIR COOLED SPLIT SYSTEMS. MODIFICATION TO THE DDC SYSTEM SHALL ALSO INCLUDE SENDING AN ADDITIONAL SIGNAL TO THE SFMTA SCADA SYSTEM, WHEN ITS REMOTE INDICATORS DETECTS A PROBLEM (E.G., FAN FAILURE OF ACU-1). NOTE: CURRENTLY, THE DDC SYSTEM SENDS ONLY A SIGNAL TO DTIS SCADA SYSTEM.
5. ALL HVAC EQUIPMENT (I.E., AIR CONDITIONING UNITS AND CONDENSERS) SHALL COMPLY WITH THE LATEST EDITION OF THE CITY AND COUNTY OF SAN FRANCISCO MECHANICAL CODE AND CALIFORNIA ENERGY EFFICIENCY STANDARD, TITLE 24. CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND FUNCTIONAL HVAC SYSTEM AND DDC SYSTEM. CONTRACTOR SHALL COMPLETE AND SIGN ALL REQUIRED TITLE 24 DOCUMENTATION.
6. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL. SHOP DRAWINGS SHALL BE SIGNED BY A PROFESSIONAL MECHANICAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA. SHOP DRAWING SHALL INCLUDE BUT NOT LIMITED TO: THE LAYOUT PLAN SHOWING AIR CONDITIONING UNITS, CONDENSERS, PIPING, FAN, LOUVERS, THERMOSTATS, REQUIRED CONDUIT AND WIRING; CONTROL DIAGRAMS AND DETAILS OF MODIFED DDC SYSTEM; MOUNTING DETAILS FOR HVAC EQUIPMENT; TITLE 24 DOCUMENTATION; UL CERTIFICATION FOR EQUIPMENT FURNISHED.
7. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DESIGN CALCULATIONS FOR THE PROPOSED SUPPORT SYSTEM. THE SUPPORT SYSTEM SHALL INCLUDE BOTH DEAD LOAD AND SEISMIC LOAD. CALCULATIONS AND DRAWINGS FOR THE SUPPORT SYSTEM SHALL BE PREPARED AND STAMPED BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER FOR DBI'S REVIEW AND APPROVAL. ALL SEISMIC DESIGN DOCUMENTS SHALL BE SUBMITTED AND APPROVED BY DBI PRIOR TO INSTALLATION. THE CONTRACTOR SHALL MARK ON THE LAYOUT DRAWINGS THE APPROXIMATE LOCATIONS TO THE SUPPORT POINTS AND TYPE OF SUPPORTS WITH SEISMIC RESTRAINTS TO BE USED.
8. CONTRACTOR SHALL PROVIDE TRAINING TO SFMTA PERSONNEL ON THE USE AND MAINTENANCE OF THE HVAC EQUIPMENT AND DDC SYSTEM; AND THE INTERACTION BETWEEN THE TRAILER HVAC SYSTEM, DDC SYSTEM, AND FIRE PROTECTION SYSTEM. CONTRACTOR SHALL PROVIDE TWO TRAINING SESSIONS UP TO FOUR HOURS EACH: ONE TRAINING SESSION FOR OPERATING PERSONNEL AND THE OTHER TRAINING FOR MAINTENANCE STAFF. CONTRACTOR SHALL PROVIDE TRAINING MATERIALS AND O&M MANUALS. O&M MANUALS SHALL INCLUDE A COMPLETE PART LIST AND LIST OF RECOMMENDED SPARE PARTS.
9. EQUIPMENT SCHEDULE PROVIDED FOR INFORMATIONAL PURPOSE ONLY.

EXISTING EQUIPMENT SCHEDULE 9

EQUIPMENT TAG	DESCRIPTION
ACU 1 AND ACU 2	AIR CONDITIONING UNIT: PACKAGED CEILING SUSPENDED DRAW THRU AIR HANDLING UNIT CONSISTING OF DIRECT EXPANSION COOLING COIL, FORWARD CURVED CENTIFUGAL BLOWER WITH HIGH EFFICIENCY MOTOR, ADJUSTABLE SHEAVE, SINGLE POINT POWER CONNECTION. SOUND ATTENUATED CABINET, RETURN AIR INLET. PERFORMANCE SHALL BE FOR A 72,900 BTUH TOTAL COOLING CAPACITY, 56,800 BTUH SENSIBLE COOLING CAPACITY WITH ENTERING AIR TERMPERATURE OF 75 DEGREES F DB, 67 DEGREES F WB WITH 2,400 CFM AT 0.24" W.G. ESP. UNIT SHALL BE U.L. LISTED, FACTORY TESTED AND ASSEMBLED. AND PROVIDED W/REMOTE PROGRAMMABLE THERMOSTAT. \pt1.75,4.5,7.5;MANUFACTURER: CARRIER ELECTRICAL: 208V/3 PHASE/60HZ \pt1.75,4.5,6.25,6.5;MODEL NUMBER: 40RM007 FAN MOTOR: 3/4 HP \pt1.75,3.875,6.25,6.5;UNIT WEIGHT: 400 LBS
ACC 1 AND ACC 2	AIR COOLED CONDENSER: CARRIER 38AK007 OUTDOOR UNIT WITH COMPRESSOR SAFEGUARD DEVICES INLCUDING TIME GUARD FEATURE, LOW AMBIENT CONTROLS. PERFORMANCE SHALL BE FOR AMBIENT TEMPERATURE OF 95 F, 24V TRANSFORMER, REFRIGERANT CHARGE OF R-22 AND AUTO RESET. \pt1.75,4.5,5.875,8;ELECTRICAL: 208V/3 PHASE/60HZ COMPRESSOR: 19.0 RATED LOAD AMPS \pt1.75,3.875,4.5,5.875,6.5;MAX. CIRCUIT AMPS: 25.6 AMPS MOCP: 35 \pt1.75,3.875,6.25,6.5;FAN MOTOR FLA: 1.9 AMPS

REFERENCE: EXCERPT FROM DRAWING SF-004-M1 DATED 12/30/97 (REVISED 1/23/98)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

DESIGNED
DRAWN
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 10/01/2009

No. M32337 Exp. 6-30-2011

THE CITY AND COUNTY OF SAN FRANCISCO

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

1240

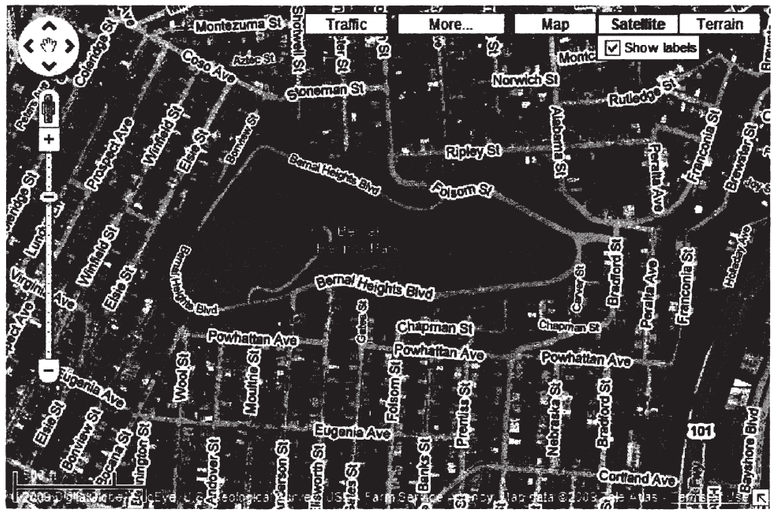
BERNAL HEIGHTS
MECHANICAL PLAN

DWG. NO. ME-26
REVISION REV. 0
SHEET NO. 40

BORDER REVISED 11/17/05

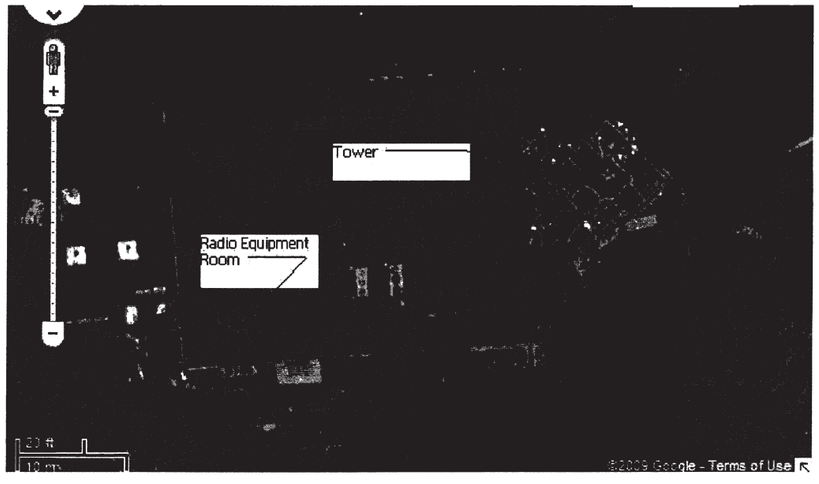
GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
3. The "35% Design", as presented, does not include the consequences of further and necessary design work that may include: subsoil investigation, structural analysis, tower structural analysis, seismic considerations, thermal management calculations, electrical load calculations, etc.
4. See "SCOPE OF WORK" on this sheet for further information.
5. The Contractor shall not start construction prior to receiving final, written approval on the resulting design.
6. The information contained in these drawings is accompanied by and supported by the Radio Replacement Project, 35% Design Specification Appendix 12, Section 5.
7. The information in these drawings is schematic in nature. It is intended to convey an outline of a desired result. The information and dimensions shall not be taken as absolute.
8. The Contractor shall be responsible for making it's own observations and measurements.
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.



SITE DESCRIPTION

This site is south of San Francisco and north west of the intersection of Rt. 101 and Rt. 280. The work site is inside of an existing building that is located in a public park. The building and attached tower are a 1950's era AT&T microwave repeater site. The building and tower are managed by American Tower. Part of the building is now being used by the City as a remote radio site. The work space is equipped with adequate lighting. There is an existing cable tray system over the existing racks. There is an existing HVAC system that was installed to support the existing radio equipment. There is an existing site and tower ground system. And, there is an existing AC power system that was installed to support the existing radio system. The new radio equipment will occupy the available space in the room and use existing facilities and infrastructure as available. The room will be provided with a FM200 fire suppression system.



SCOPE OF WORK

35% Design Specification Appendix 12, Section 5.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Bros. Maps	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RC

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is incomplete and is based on best available information at a 35% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

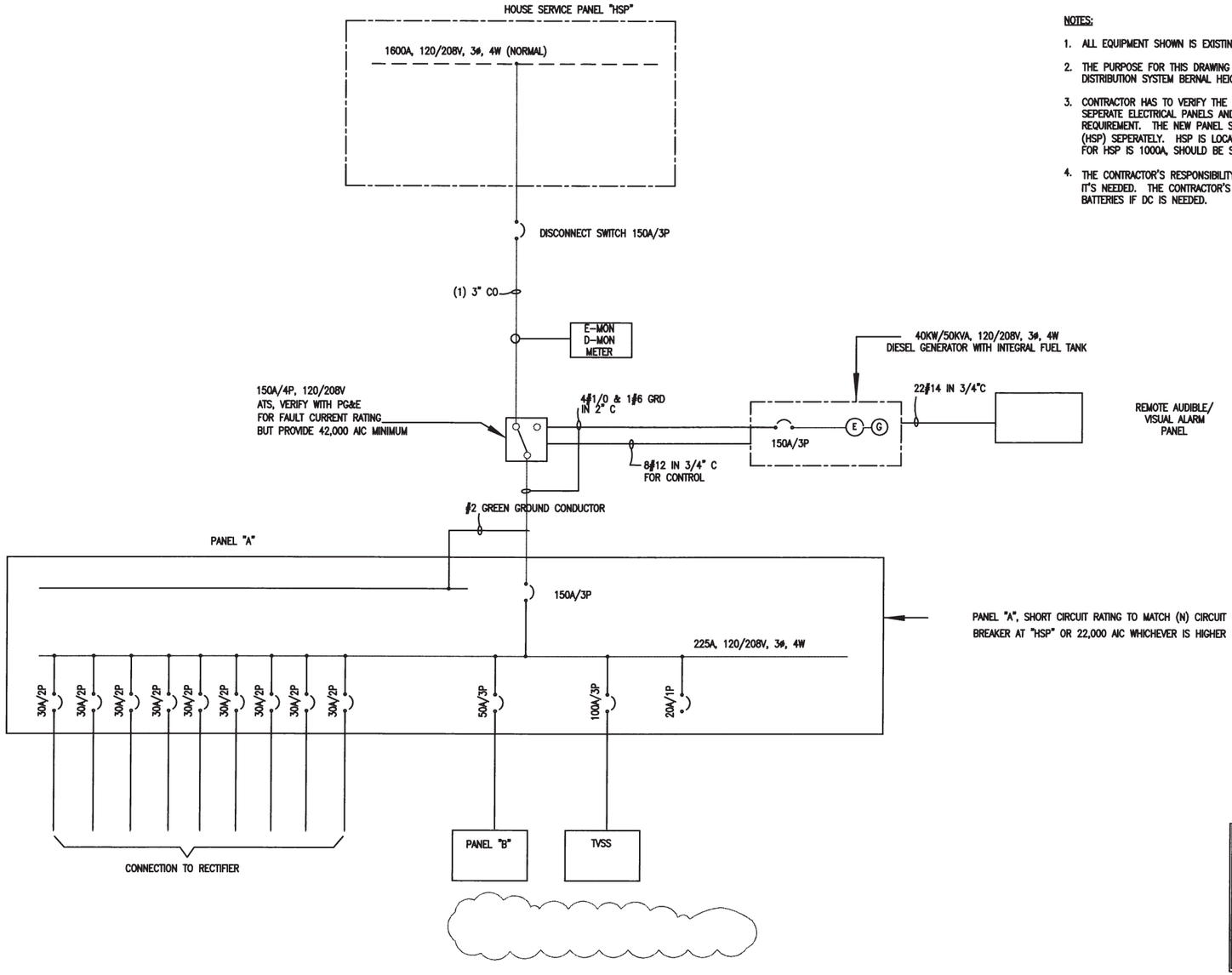
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

BERNAL HEIGHTS
COVER SHEET

1240

DWG. NO.	REVISION
G-04	REV. 0
SHEET NO. 35	



NOTES:

1. ALL EQUIPMENT SHOWN IS EXISTING UNLESS OTHERWISE NOTED AS NEW.
2. THE PURPOSE FOR THIS DRAWING IS TO STATE THE CURRENT POWER DISTRIBUTION SYSTEM BERNAL HEIGHT RADIO SITE.
3. CONTRACTOR HAS TO VERIFY THE EXISTING CONDITION, DESIGN AND PROVIDE SEPERATE ELECTRICAL PANELS AND WIRING TO MEET NEW RADIO LOAD REQUIREMENT. THE NEW PANEL SHOULD BE FED BY HOUSE SERVICE PANEL (HSP) SEPERATELY. HSP IS LOCATED IN DIFFERENT ROOM. PG&E INCOMING FOR HSP IS 1000A, SHOULD BE SUFFICENT FOR THE NEW RADIO SYSTEM.
4. THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL A NEW UPS IF IT'S NEEDED. THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL BATTERIES IF DC IS NEEDED.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dec. Mgr	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith, PE # E14042
PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
The document is normal size (22x34) and based on best available information at a 30% completed Radio Replacement infrastructure design

DESIGNED	JF
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

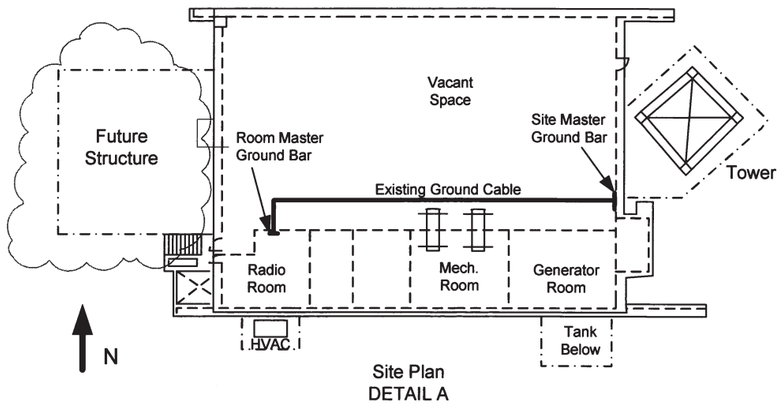
1240

BERNAL HEIGHTS
ELECTRICAL EXISTING DETAILS

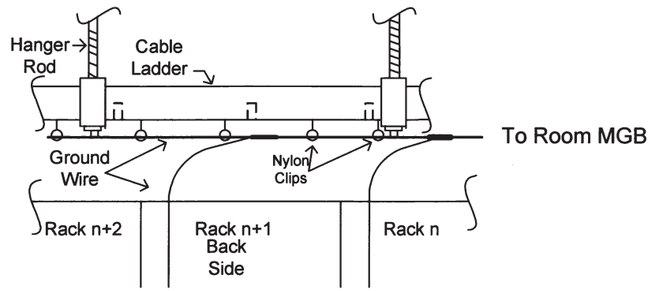
DWG. NO. EL-12
SHEET NO. 41
REVISION REV. 0

Muni Radio System Replacement Project
Drawing Review Stamp

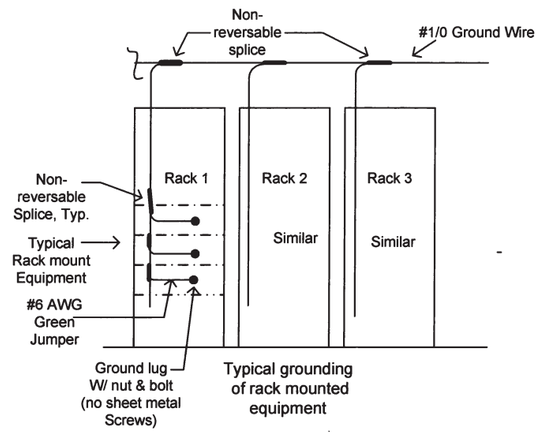
	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dos Mgs	11/12/09
Verifier		



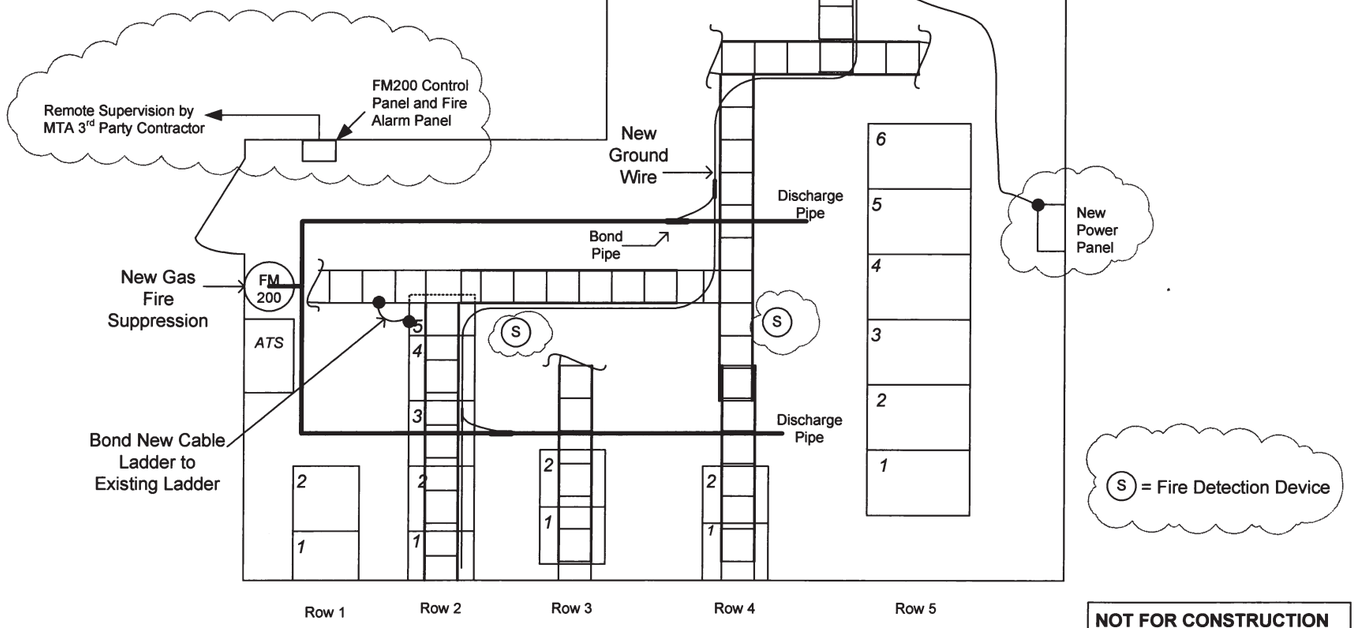
Site Plan
DETAIL A



Elevation of
Space Above New Racks
DETAIL D



Cabinet Grounding Detail
DETAIL B



Radio Room Grounding Detail
DETAIL C

NOT FOR CONSTRUCTION

NOT TO SCALE

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RC
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is correct and complete based on best available information as an SFMTA consultant Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

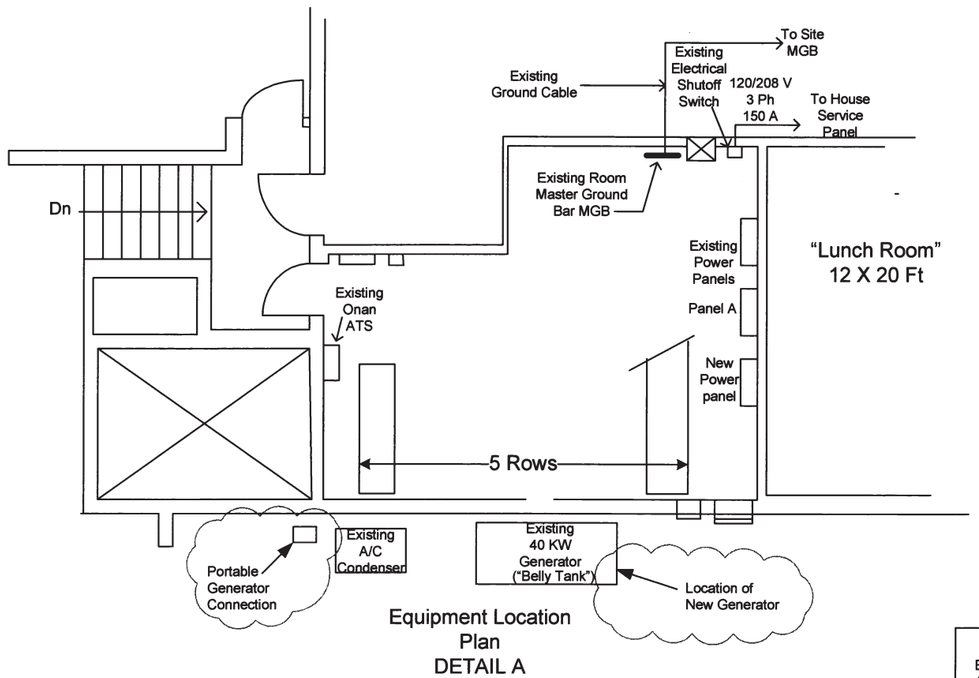
BERNAL HEIGHTS
SITE GROUNDING

1240

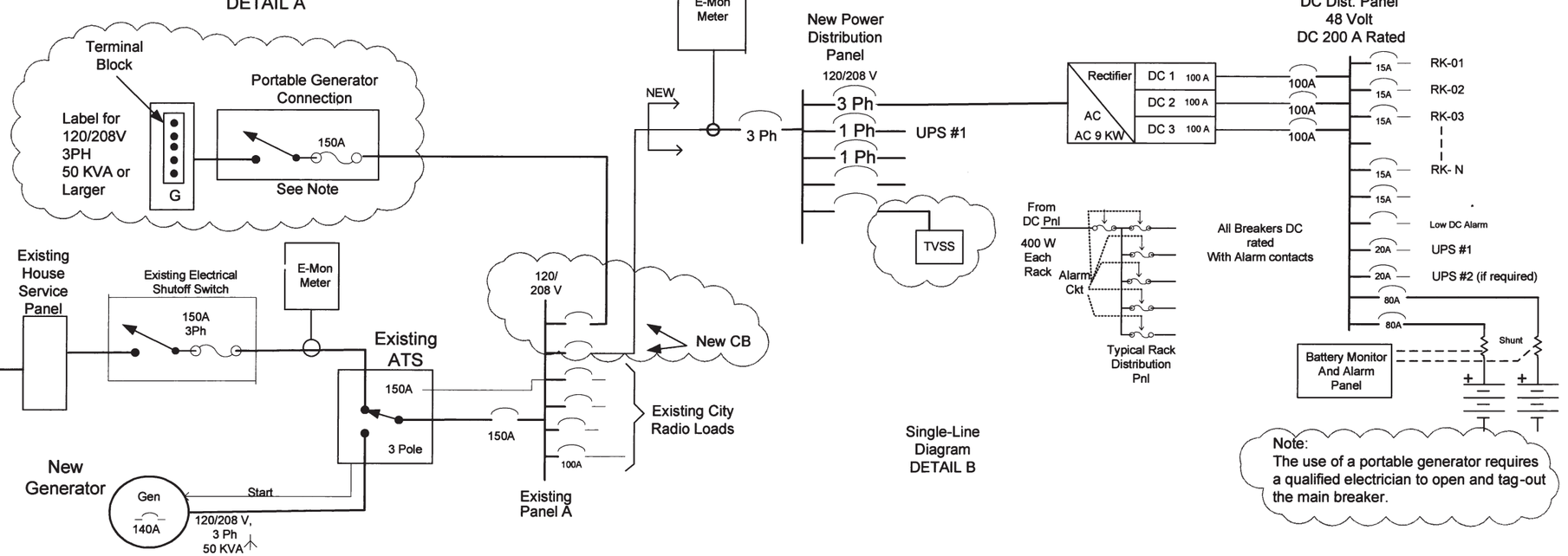
DWG NO. EL-02

SHEET NO. 38

REVISION REV. 0



Equipment Location Plan
DETAIL A



Single-Line Diagram
DETAIL B

Note:
The use of a portable generator requires a qualified electrician to open and tag-out the main breaker.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dec. Mgr	11/12/09
Verifier		

NOT FOR CONSTRUCTION

NOT TO SCALE

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is issued and accepted based on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

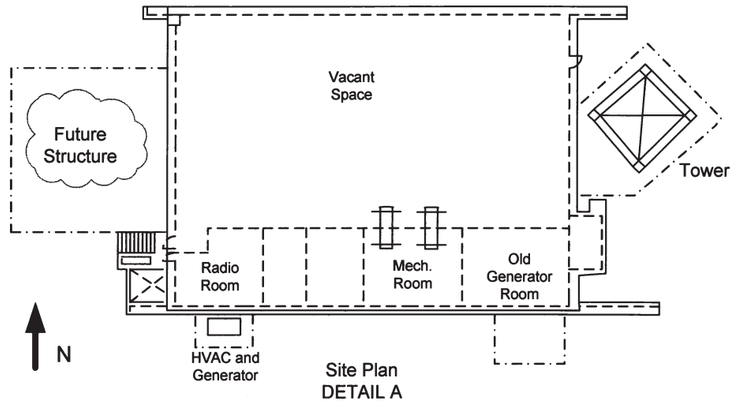
BERNAL HEIGHTS
SITE ELECTRICAL

1240

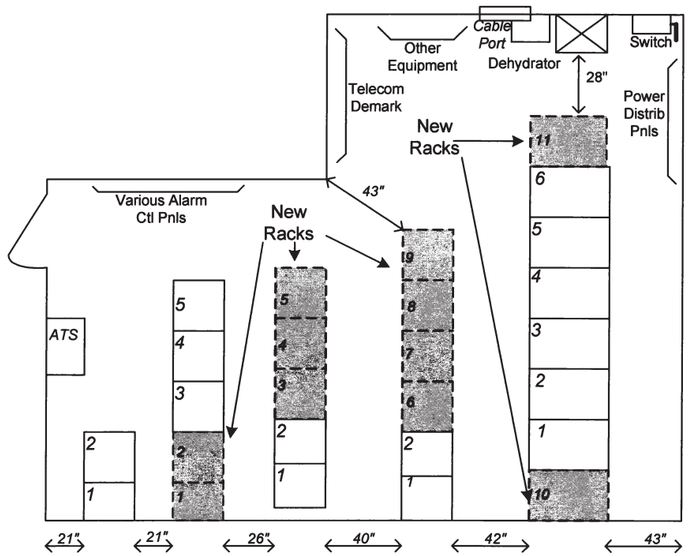
DWG NO EL-01

SHEET NO. 37

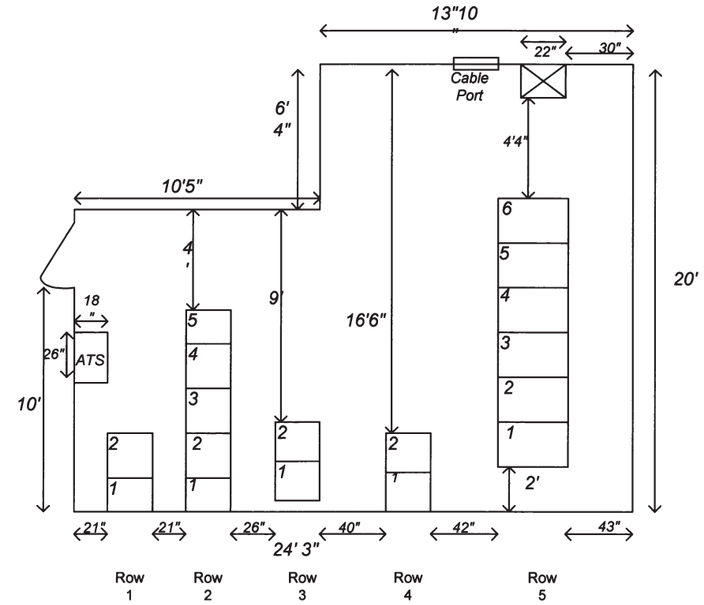
REVISION REV. 0



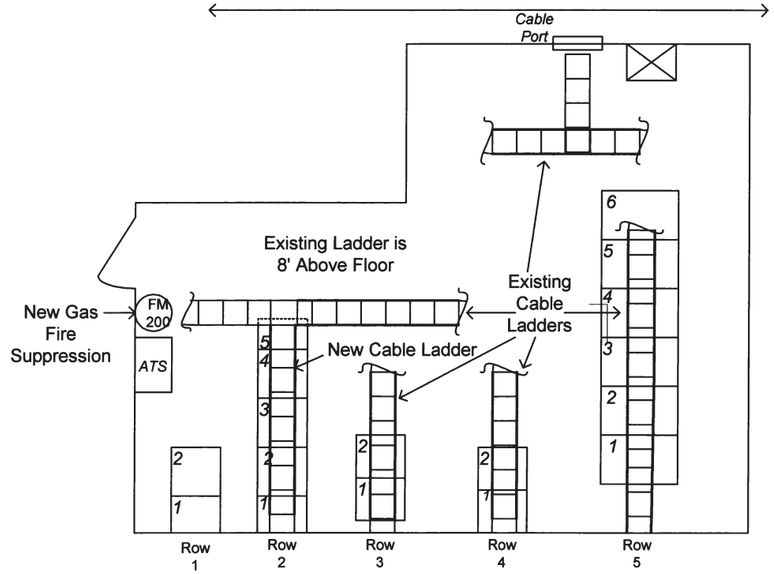
Site Plan
DETAIL A



New Radio Room Plan
DETAIL B



Existing Radio Room Plan
DETAIL C



New Hardware
DETAIL D

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Rez. Mgr	11/12/09
Verifier		

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NOT TO SCALE

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/23/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is correct and accurate and based on best available information at a 75% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

1240

RADIO SYSTEM REPLACEMENT PROJECT

BERNAL HEIGHTS
SITE PLAN

DWG. NO. AR-01
SHEET NO. 36
REVISION REV. 0

LEGEND

SUPPLY AIR

EXHAUST AIR

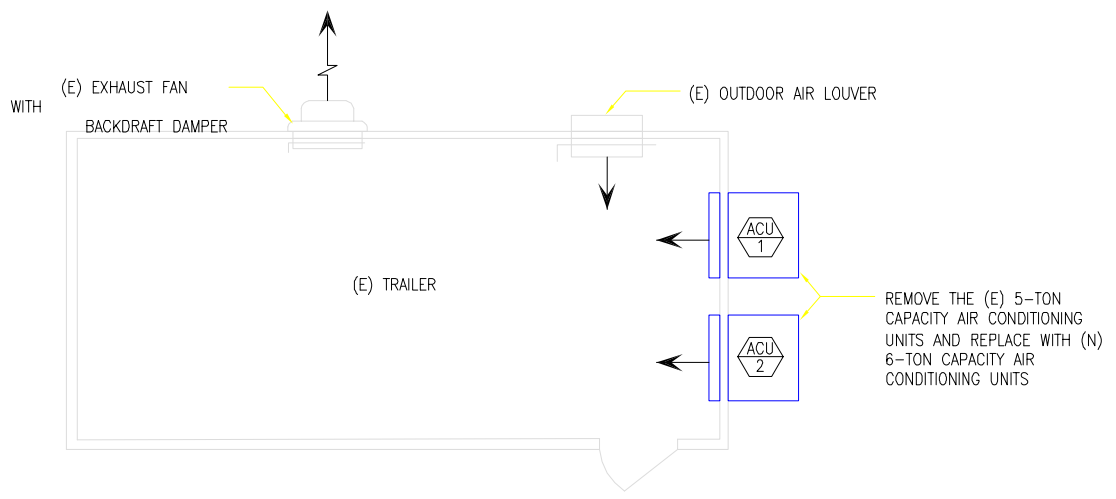
AIR DAMPER

ABBREVIATIONS

\pt0.75;ACU AIR CONDITIONING UNIT
BTUH BRITISH THERMAL UNIT PER HOUR
CFM CUBIC FEET MINUTE
DB DRY BULB TEMPERATURE
DDC DIRECT DIGITAL CONTROL
DTIS SF DEPT. OF TELECOMMUNICATIONS & INFORMATION SERVICES
(E) EXISTING
ESP EXTERNAL STATIC PRESSURE
F FAHRENHEIT
HP HORSEPOWER
HZ HERTZ
NTS NOT TO SCALE
O&M OPERATION AND MAINTENANCE
SCADA SUPERVISORY CONTROL AND DATA ACQUISITION
SF SAN FRANCISCO
SFMTA SF MUNICIPAL TRANSPORTATION AGENCY
V VOLTS
WB WET BULB TEMPERATURE
WG WATER GAUGE

EQUIPMENT SCHEDULE

EQUIPMENT TAG	DESCRIPTION
ACU 1 AND ACU 2	AIR CONDITIONING UNIT: PACKAGED VERTICAL WALLMOUNT UNIT CONSISTING OF DIRECT EXPANSION COOLING COIL, FORWARD CURVED CENTIFUGAL BLOWER WITH HIGH EFFICIENCY MOTOR, ADJUSTABLE SHEAVE, SINGLE POINT POWER CONNECTION. UNIT SCHALL PROVIDE A TOTAL COOLING CAPACITY OF 72,000 BTUH. \pt1.75,3.875,6.25,6.5;MANUFACTURER: MARVAIR OR EQUAL MODEL NUMBER: AVPA 72 ACC ELECTRICAL: 208 V/3 PHASE/60 HZ RATED LOAD AMPS: 22.4 AMPS


(E) EXHAUST FAN WITH BACKDRAFT DAMPER
(E) OUTDOOR AIR LOUVER
(E) TRAILER
ACU 1
ACU 2
REMOVE THE (E) 5-TON CAPACITY AIR CONDITIONING UNITS AND REPLACE WITH (N) 6-TON CAPACITY AIR CONDITIONING UNITS

1 – **MECHANICAL FLOOR PLAN**
NTS

NOTES:

1. PRIOR TO SUBMITTAL OF BIDS, CONTRACTOR SHALL VISIT THE JOB TO VERIFY (E) CONDITIONS WHICH IMPACT THE DESIGN, DEMOLITION AND CONSTRUCTION REQUIREMENTS UNDER THIS CONTRACT; AND REVIEW (E) SITE DRAWINGS SF-007-M1 AND SF007-M2 DATED 12/30/97. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ITS OWN OBSERVATION AND MEASUREMENTS.

2. THE CONTRACTOR SHALL REMOVE THE TWO (E)MARV-AIR 5-TON CAPACITY AIR CONDITIONING UNITS AND REPLACE WITH TWO (N) MARVA-AIR 6-TON CAPACITY AIR CONDITIONING UNITS. THE

   (N) EQUIPMENT SHALL BE U.L. LISTED, FACTORY TESTED AND ASSEMBLED.

3. CONTRACTOR SHALL REPLACE AND INSTALL ANY EXISTING PIPING, CONDUITS, SUPPORTS, AND HANGERS REQUIRED TO SUPPORT AND OPERATE THE TWO NEW 6-TON SYSTEMS PER EQUIPMENT

   MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS, AND THE LATEST CITY AND COUNTY OF SAN FRANCISCO MECHANICAL CODE, BUILDING CODE, AND ELECTRICAL CODE. THE MORE STRINGENT REQUIREMENTS SHALL APPLY.

4. THE CONTRACTOR SHALL MODIFY THE (E) DDC SYSTEM TO MONITOR AND CONTROL THE (N) AIR

   CONDITIOING UNITS.

   MODIFICATION TO THE DDC SYSTEM SHALL ALSO INCLUDE SENDING AN ADDITIONAL SIGNAL TO THE SFMTA SCADA SYSTEM, WHEN ITS REMOTE INDICATORS DETECTS A PROBLEM (E.G., FAN FAILURE OF ACU-1). NOTE: CURRENTLY, THE DDC SYSTEM SENDS A SIGNAL ONLY TO DTIS SCADA SYSTEM.

5. ALL HVAC EQUIPMENT (I.E., AIR CONDITIONING UNITS) SHALL COMPLY WITH THE LATEST EDITION OF THE CITY AND COUNTY OF SAN FRANCISCO MECHANICAL CODE AND CALIFORNIA ENERGY EFFICIENCY STANDARD, TITLE 24. CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND FUNCTIONAL HVAC SYSTEM AND DDC SYSTEM. CONTRACTOR SHALL COMPLETE AND SIGN ALL REQUIRED TITLE 24 DOCUMENTATION.

6. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL. SHOP DRAWINGS SHALL BE SIGNED BY A PROFESSIONAL MECHANICAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA. SHOP DRAWING SHALL INCLUDE BUT NOT LIMITED TO:

   THE LAYOUT PLAN SHOWING AIR CONDITIONING UNITS, PIPING, FAN, LOUVERS, THERMOSTATS, REQUIRED CONDUIT AND WIRING; CONTROL DIAGRAMS AND DETAILS OF MODIFED DDC SYSTEM; MOUNTING DETAILS FOR HVAC EQUIPMENT; TITLE 24 DOCUMENTATION; UL CERTIFICATION FOR EQUIPMENT FURNISHED.

7. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DESIGN CALCULATIONS FOR THE PROPOSED SUPPORT SYSTEM. THE SUPPORT SYSTEM SHALL INCLUDE BOTH DEAD LOAD AND SEISMIC LOAD. CALCULATIONS AND DRAWINGS FOR THE SUPPORT SYSTEM SHALL BE PREPARED

   AND STAMPED BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER FOR DBI'S REVIEW AND APPROVAL. ALL SEISMIC DESIGN DOCUMENTS SHALL BE SUBMITTED AND APPROVED BY DBI PRIOR TO INSTALLATION. THE CONTRACTOR SHALL MARK ON THE LAYOUT DRAWINGS THE APPROXIMATE LOCATIONS TO THE SUPPORT POINTS AND TYPE OF SUPPORTS WITH SEISMIC RESTRAINTS TO BE USED.

8. CONTRACTOR SHALL PROVIDE TRAINING TO SFMTA PERSONNEL ON THE USE AND MAINTENANCE OF THE HVAC EQUIPMENT AND DDC SYSTEM; AND THE INTERACTION BETWEEN THE TRAILER HVAC

   SYSTEM, DDC SYSTEM, AND FIRE PROTECTION SYSTEM. CONTRACTOR SHALL PROVIDE TWO TRAINING SESSIONS UP TO FOUR HOURS EACH: ONE TRAINING SESSION FOR OPERATING PERSONNEL AND THE OTHER TRAINING FOR MAINTENANCE STAFF. CONTRACTOR SHALL PROVIDE

   TRAINING MATERIALS AND O&M MANUALS. O&M MANUALS SHALL INCLUDE A COMPLETE PART LIST AND LIST OF RECOMMENDED SPARE PARTS.

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

BORDER REVISED 11/17/05

DESIGNED
DRAWN
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 10/01/2009

No. M32337 Exp. 6-30-2011

THE CITY AND COUNTY OF SAN FRANCISCO

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

1240

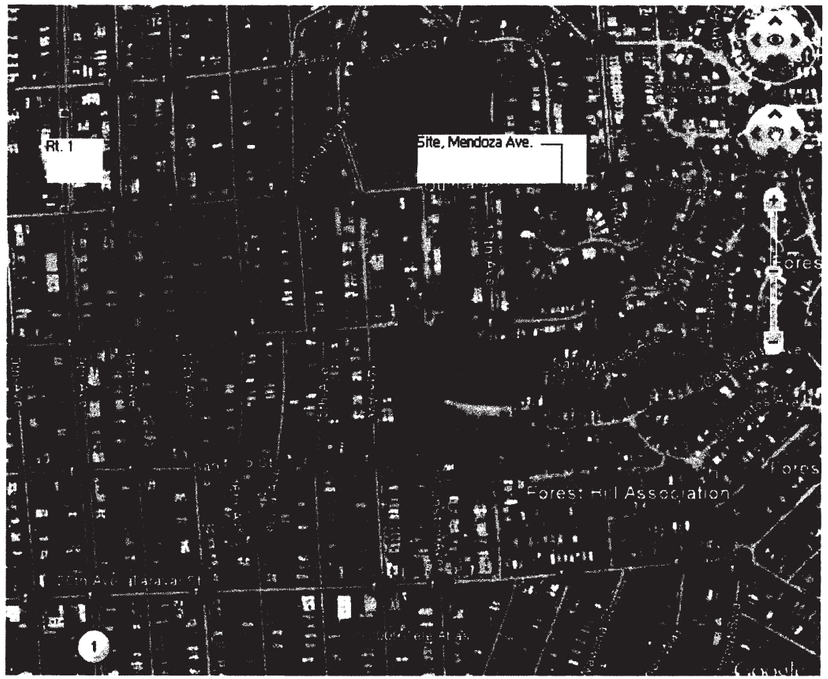
FOREST HILL
MECHANICAL PLAN

DWG. NO. ME-25
SHEET NO. 46
REVISION REV. 0

Xref ..\Standard\TBMTA_MUNI_D.dwg

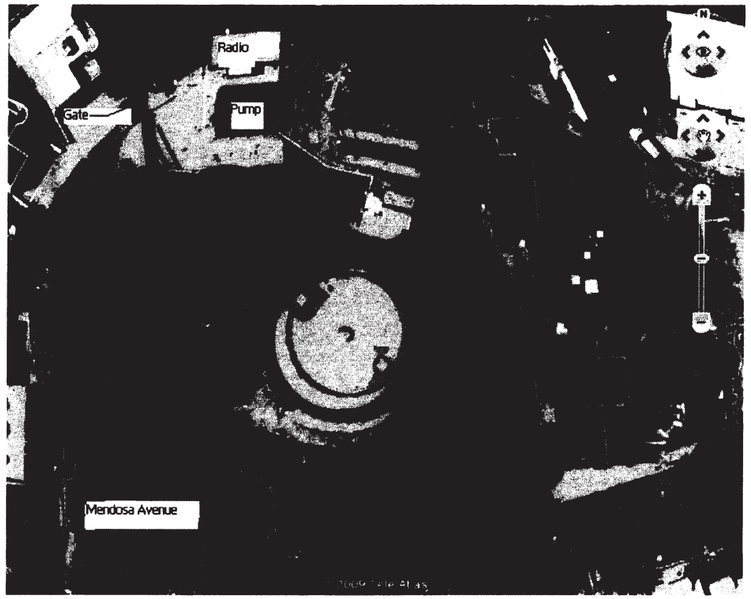
GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
3. The "35% Design", as presented, does not include the consequences of further and necessary design work that may include: subsoil investigation, structural analysis, tower structural analysis, seismic considerations, thermal management calculations, electrical load calculations, etc.
4. See "SCOPE OF WORK" on this sheet for further information.
5. The Contractor shall not start construction prior to receiving final, written approval on the resulting design.
6. The information contained in these drawings is accompanied by and supported by the Radio Replacement Project, 35% Design Specification Section 12, Appendix 5.
7. The information in these drawings is schematic in nature. It is intended to convey an outline of a desired result. The information and dimensions shall not be taken as absolute.
8. The Contractor shall be responsible for making it's own observations and measurements.
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.



SITE DESCRIPTION

This hill top site is at the end of Mendos Avenue and south west of Twin Peaks Park. The site is a City Water Department storage tank site. The site currently includes: two water tanks, a pump house, a prefabricated radio building and a monopole. The site is in a densely populated residential neighborhood and is fenced. The site is partly paved and partly gravel/dirt covered. The site terrain is not level. The east side of the site falls off very steeply and is thickly covered with vegetation. There are subsurface pipes, valves and valve boxes. An interim shelter shall be installed in the available space behind the water tanks. This interim shelter shall be connected to the existing shelter by interim cable and conduit. The interim site location can only be accessed by passing between the tanks, a 4' space. The existing MUNI radio equipment will be moved to the interim site and new radio equipment will be installed in the existing shelter. Study the existing shelter power system and confirm sufficient power for interim shelter.



SCOPE OF WORK

35% Specification Appendix 12, Section 5.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Bros. Maps	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RC
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is signed as a draft and based on best available information at a 35% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CED

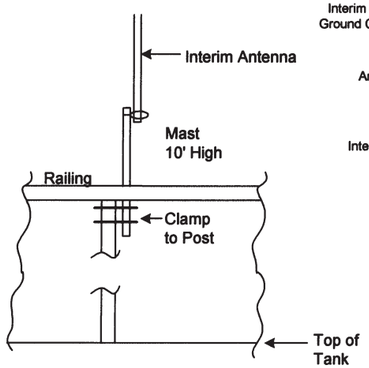
RADIO SYSTEM REPLACEMENT PROJECT

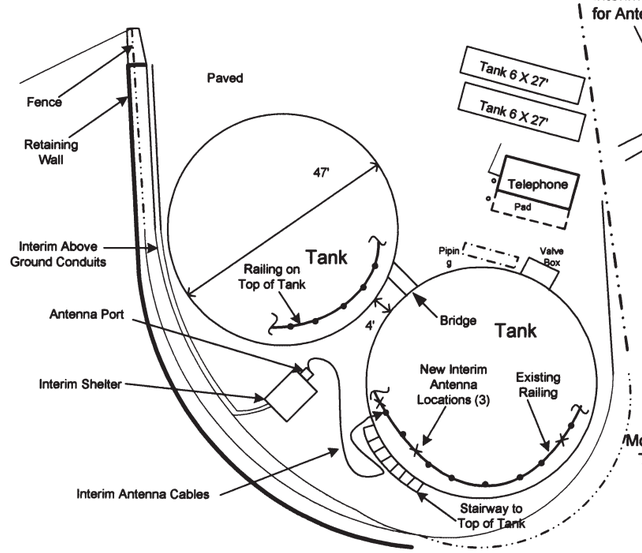
FOREST HILL
COVER SHEET

1240

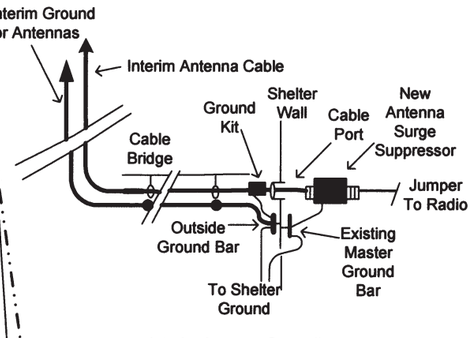
DWG. NO.	REVISION
G-05	REV. 0
SHEET NO. 42	

Detail of Interim Antenna Mounting
DETAIL B

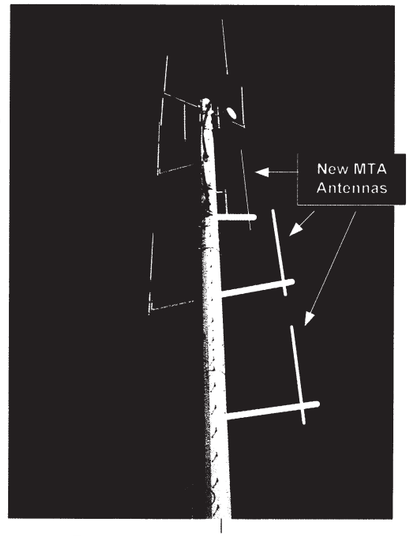




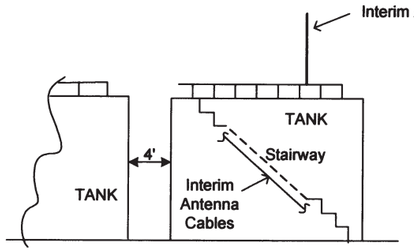
Interim Antenna Locations
DETAIL A



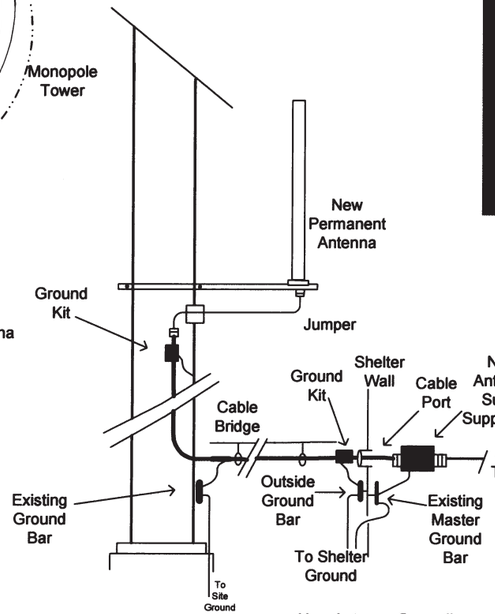
Interim Antenna Grounding
DETAIL D



Existing Monopole with Existing City and MUNI Antennas. New, Permanent Antennas Also Shown
DETAIL F



Tank Elevation from Interim Shelter
DETAIL C



New Antenna Grounding
DETAIL E

Frank J. Smith PE # E14042

November 24, 2009
This document is correct and accurate and based on best available information at a 35% completed Radio Replacement Infrastructure design.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Norma Rev. Dgs	11/12/09
Verifier		

NOT FOR CONSTRUCTION

NOT TO SCALE

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
0	10/27/09	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith PE # E14042 — REGISTERED PROFESSIONAL ENGINEER — FRANK J. SMITH — E14042 — CIVIL — STATE OF CALIFORNIA — November 24, 2009 — This document is correct and accurate and based on best available information at a 35% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/23/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

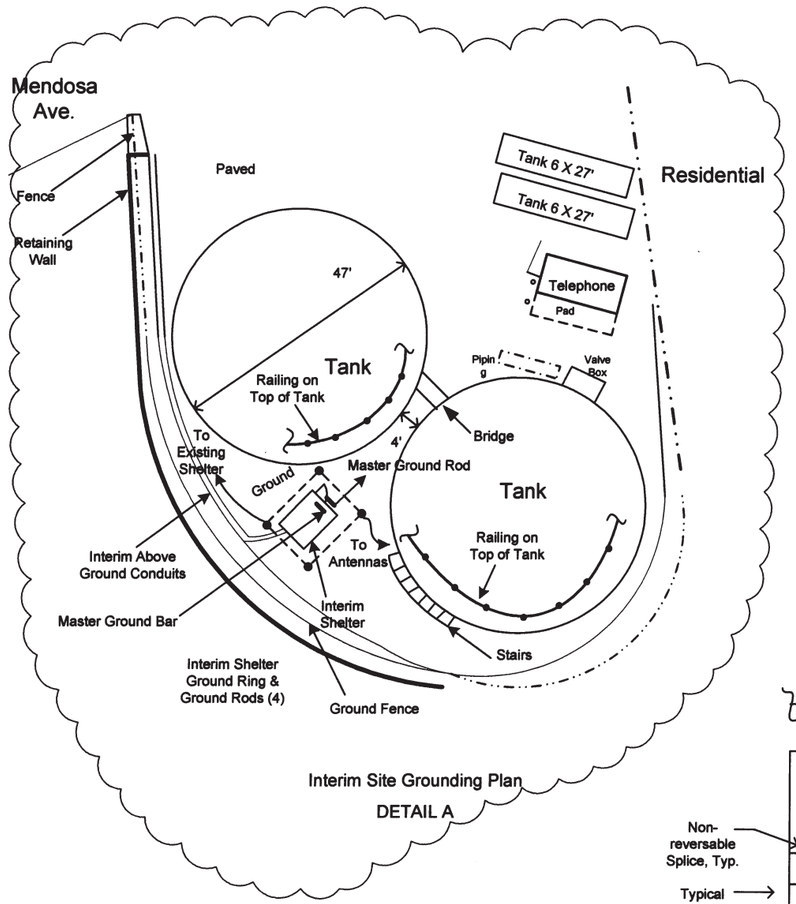
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

FOREST HILL
ANTENNA DETAILS

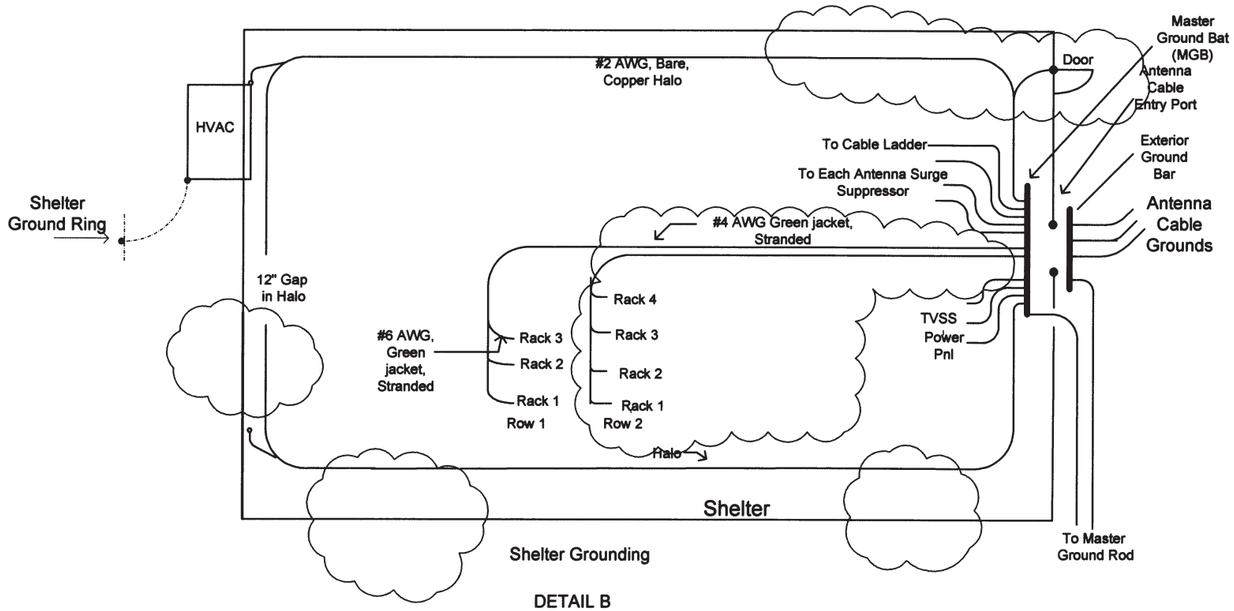
1240

DWG. NO.	REVISION
EL-15	REV. 0
SHEET NO. 44	



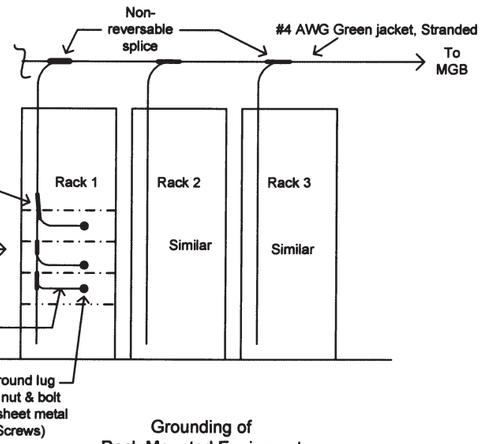
Interim Site Grounding Plan

DETAIL A



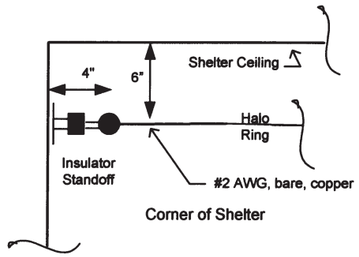
Shelter Grounding

DETAIL B



Grounding of Rack Mounted Equipment

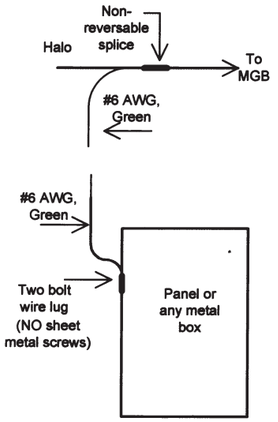
DETAIL C



Corner of Shelter

Halo Installation

DETAIL D



Electrical Box Grounding

DETAIL E

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Bus. Mgr.	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RC

REVISIONS

Frank J. Smith PE, # E14042
PROFESSIONAL ENGINEER — FRANK J. SMITH — E14042 — ELECTRICAL — STATE OF CALIFORNIA
November 24, 2009
This document is correct and suitable and based on best available information at a 50% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

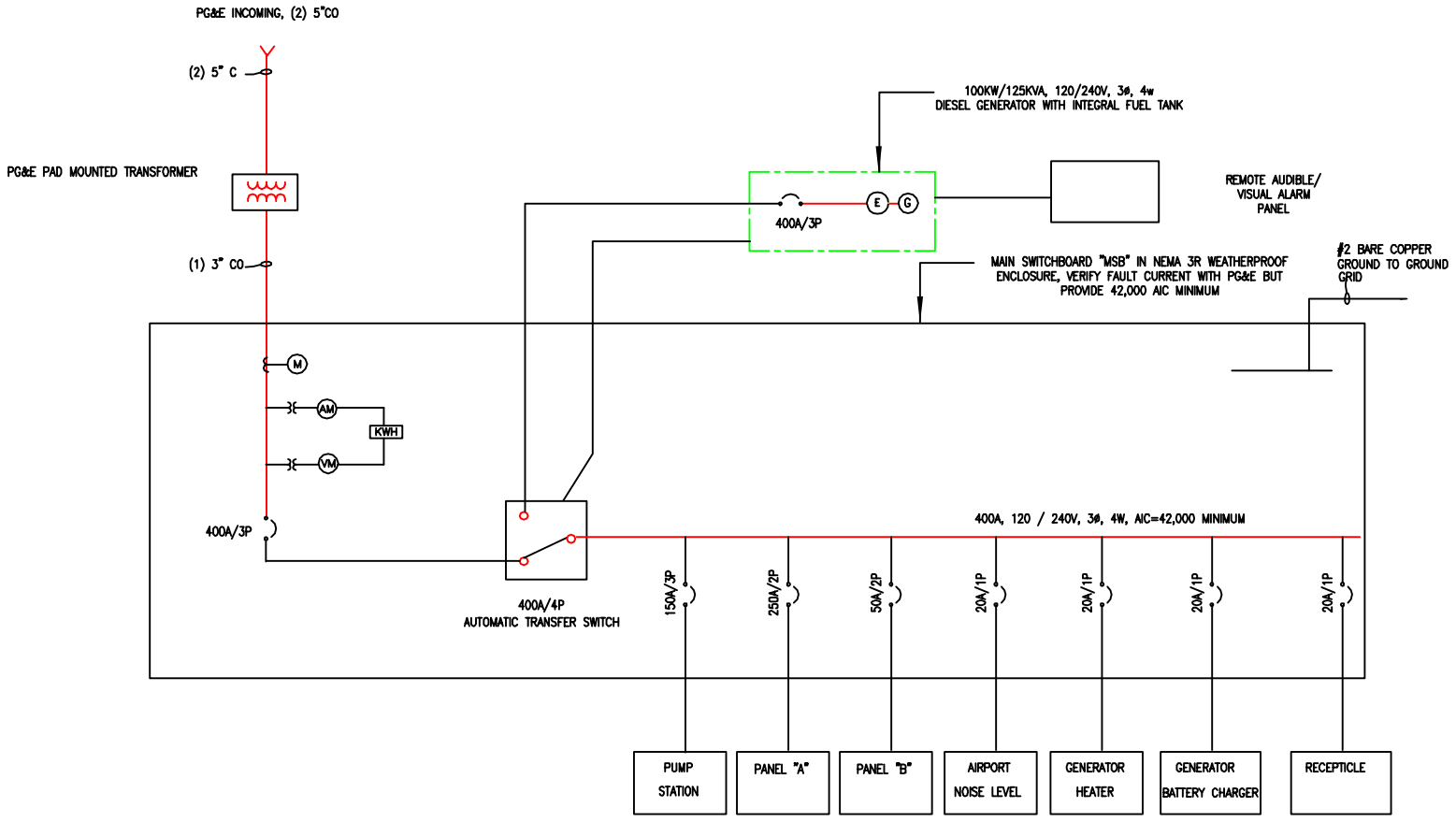
for the EXECUTIVE DIRECTOR / CEO

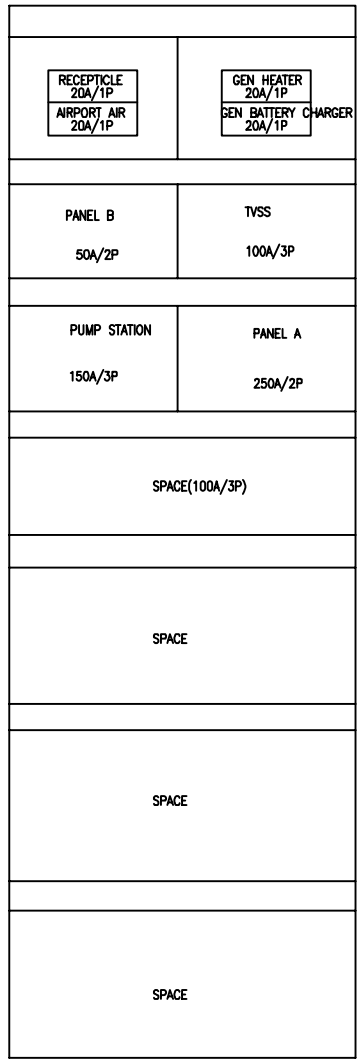
1240

RADIO SYSTEM REPLACEMENT PROJECT

FOREST HILL
SITE GROUNDING

DWG. NO.	REVISION
EL-14	
SHEET NO. 48	REV. 0





"MSB" LAYOUT

NOTES:

1. ALL EQUIPMENT SHOWN IS EXISTING UNLESS OTHERWISE NOTED AS NEW. CURRENTLY THIS SITE IS CCSF CERS AND MUNI SITE.
2. THE PURPOSE FOR THIS DRAWING IS TO STATE THE CURRENT POWER DISTRIBUTION SYSTEM AS WELL AS THE EXISTING SPARE AND SPACE AT THE MAIN SWITCH BOARD (MSB)
2. SINCE THE SITE IS CITY OF SAN FRANCISCO WATER DEPARTMENT SITE, THE MSB AND EMERGENCY GENERATOR PROVIDE LOAD TO WATER PUMP STATION AND RADIO SYSTEM.
3. CONTRACTOR IS RESPONSIBLE TO RELOCATE MUNI EXISTING RADIO EQUIPMENT TO A TEMPERARY TRAILOR WHILE INSTALL THE NEW RADIO EQUIPMENT FOR THIS SITE
4. THE RELOCATION OF THE EXISTING MUNI RADIO EQUIPMENT SHOULD HAPPEN AT NON REVENUE HOUR AND MINIMUM INTERRUPT NOMAL OPERATIONS. THE CONSTRUCTION PLAN SHOULD BE APPROVED BY SFMTA STAFF BEFORE IT HAPPEN.
5. SINCE PG&E CAN ONLY PROVIDE 120/240V FOR THIS SITE. THIS SITE CURRENT WIRING IS DIFFERENT FROM FLOUR DENIAL DETAIL DESIGN DRAWING. CONTRACTOR'S RESPONSIBLITY TO VERIFY THE EXISTING WIRING.

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED

REVISIONS

DESIGNED JF
DRAWN DEL
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 10/23/2009

No. E9168
Exp. 9-30-11

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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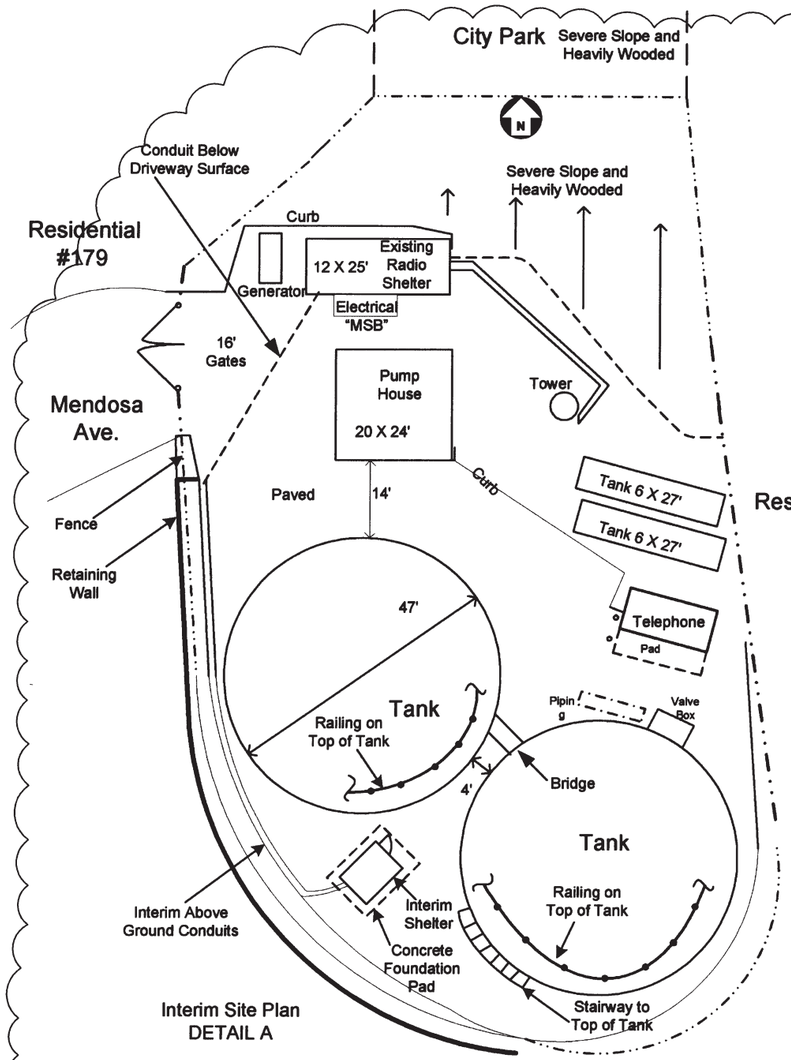
1240

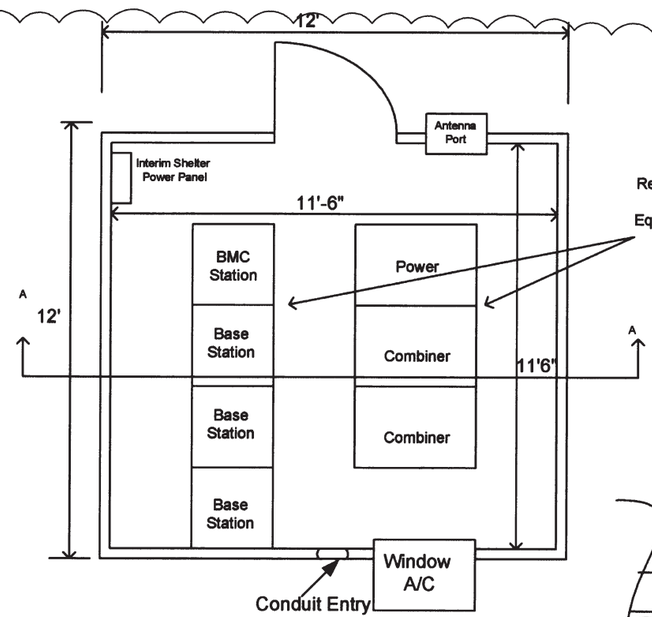
RADIO SYSTEM REPLACEMENT PROJECT

FOREST HILL
ELECTRICAL EXISTING CONDITIONS

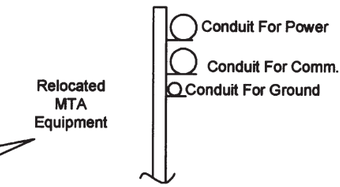
DWG. NO. EL-13
REVISION REV. 0
SHEET NO. 47



Interim Site Plan
DETAIL A



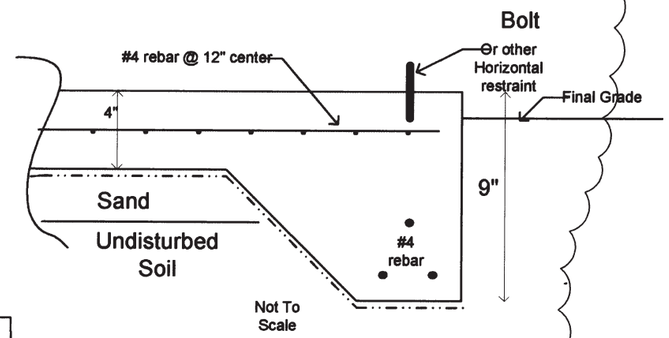
Interim Shelter Plan
DETAIL B



Interior Above Ground Conduits
DETAIL D

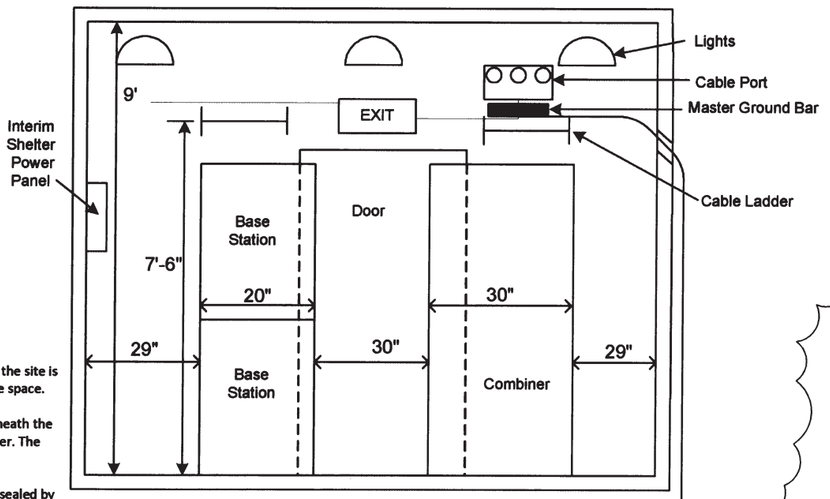
NOT FOR CONSTRUCTION

NOT TO SCALE



Actual foundation shall conform to the engineers specifications.

Typical Foundation Section
DETAIL E



Interim Shelter Elevation A-A
DETAIL C

Notes:

The Interim Shelter site is surrounded by a fence, trees, a retaining wall and water tanks. Access for construction materials to enter the site is limited to the 4 foot wide opening between the tanks. A shelter and tower, now removed, have previously been located in the same space.

Power and communications conduits shall be run from the existing shelter to the Interim shelter. The conduits shall be installed beneath the driveway from the existing shelter to the retaining wall. They will be run above ground along the fence and wall to the interim shelter. The driveway surface shall be immediately and completely restored. There is a drainage trough in the area.

The Interim shelter shall be manufactured of precast, reinforced concrete in six sections. All joints shall be interlocking and shall be sealed by imbedded rubber seals. Sections shall be bolted together to place all seals under uniform compression. The shelter shall be assembled and inspected at the factory prior to delivery to the site. All wall openings, mounting embedments and hardware mounting brackets shall be installed and finished at the factory. The floor of the shelter shall be placed on and bolted to the foundation slab.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dec. Aug	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
Exp. 3/31/2010
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is sealed and accurate and based on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
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RECOMMENDED	
APPROVED	
DATE	10/01/2009

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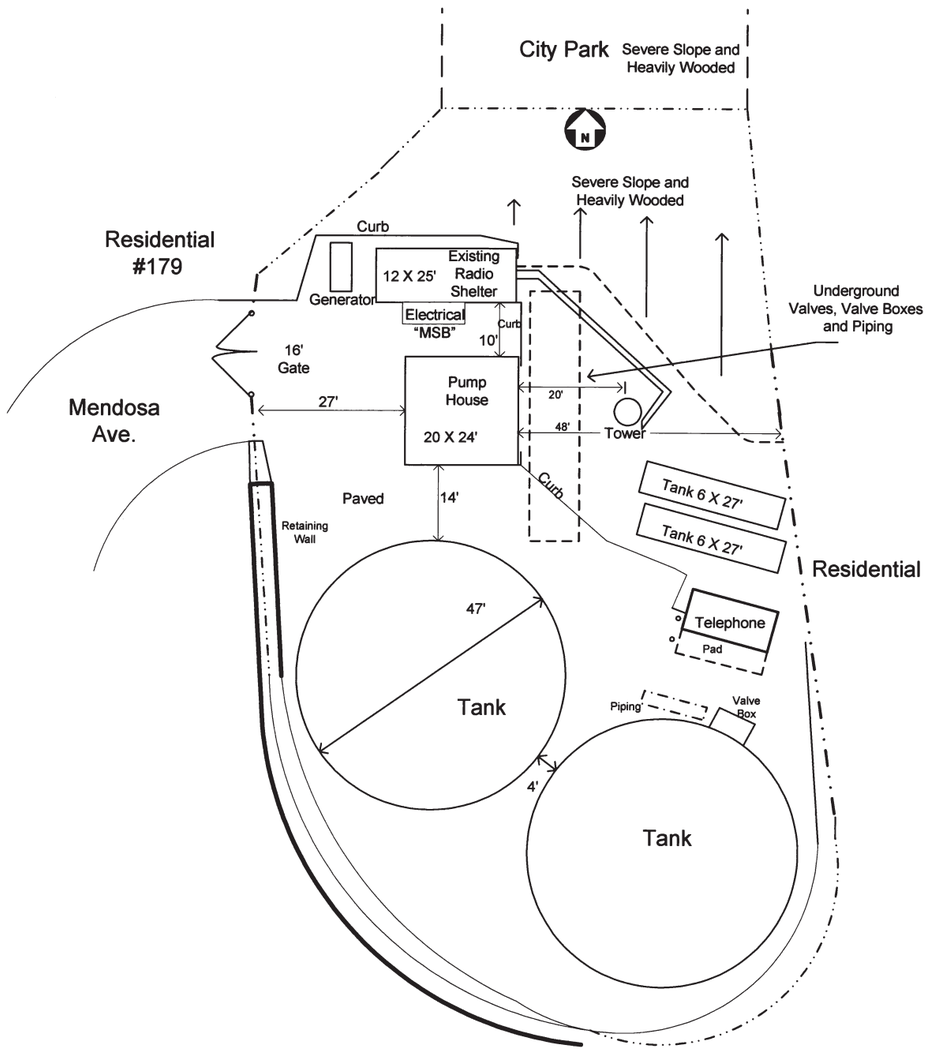
RADIO SYSTEM REPLACEMENT PROJECT

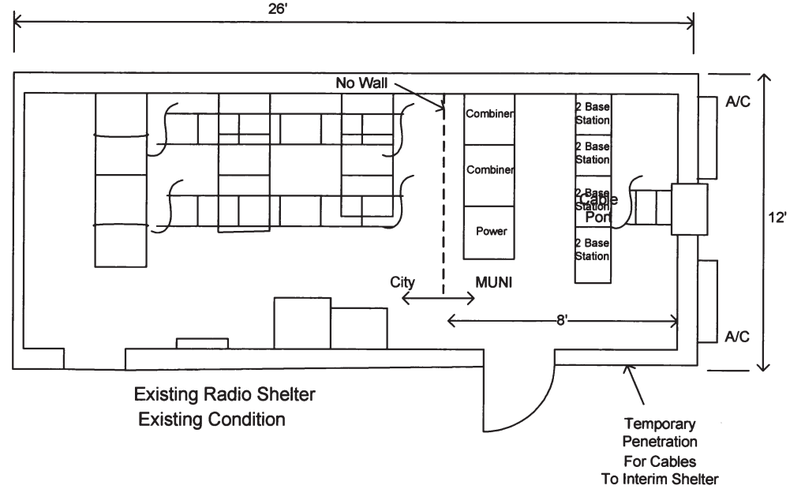
1240

FOREST HILL
INTERIM SITE PLAN

DWG. NO. AR-03
SHEET NO. 44
REVISION REV. 0

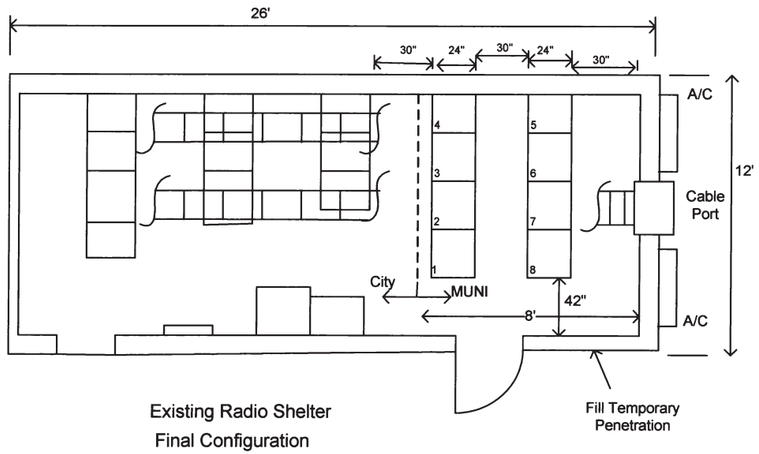


Existing Site Plan



Existing Radio Shelter
Existing Condition

Temporary Penetration For Cables To Interim Shelter



Existing Radio Shelter
Final Configuration

Fill Temporary Penetration

NOT FOR CONSTRUCTION

NOT TO SCALE

Relocate existing MUNI radio equipment to Interim Shelter.
Power Interim shelter from a temporary connection to Panel "A".
Install new MUNI radio equipment in existing shelter.
Reuse: Power Panel, lighting, grounding and cable ladders.
Provide new antenna surge protection at cable port.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	for Thomas Dec. Mgr	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
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B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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MUNICIPAL TRANSPORTATION AGENCY

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RADIO SYSTEM REPLACEMENT PROJECT

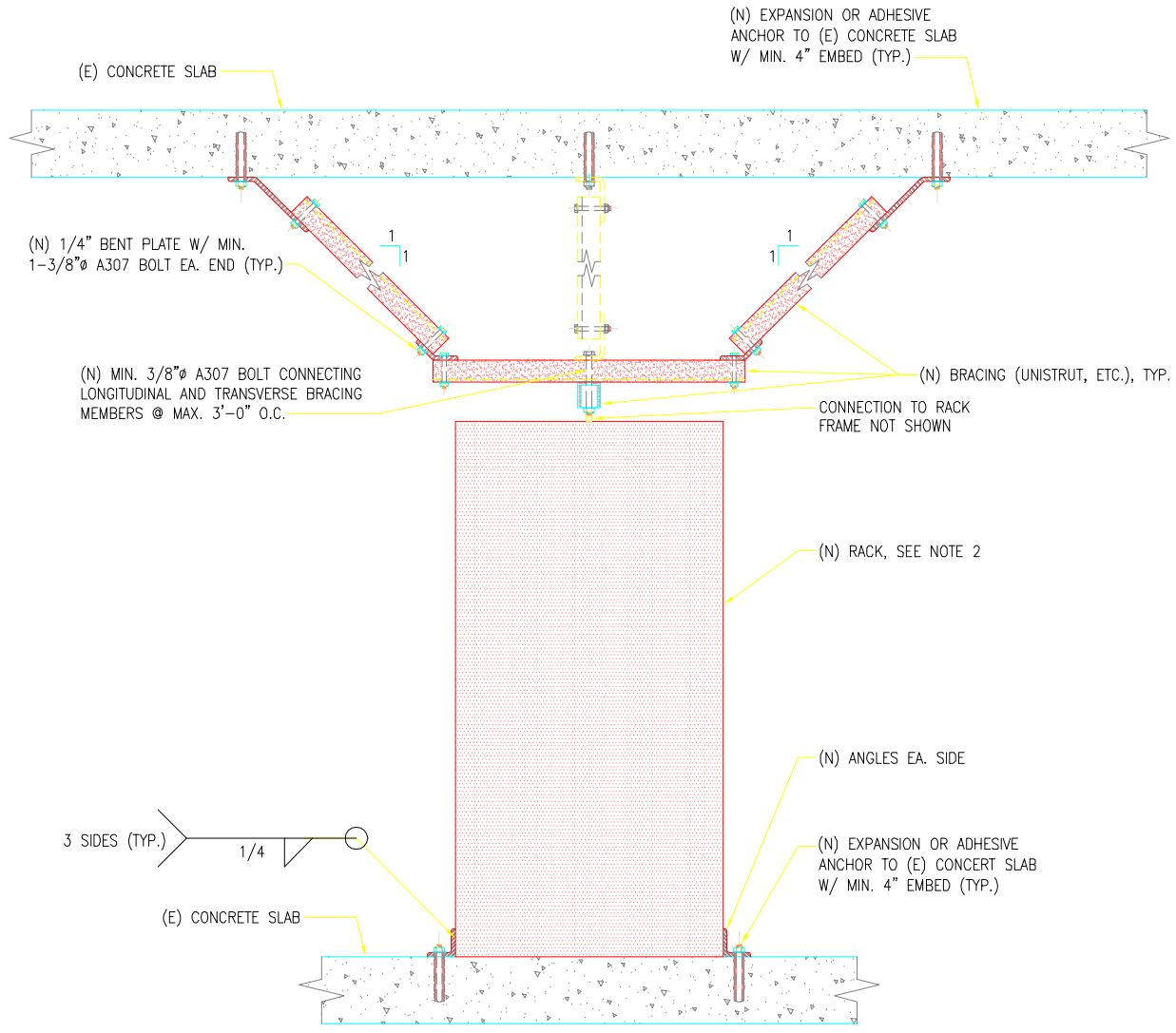
FOREST HILL
SITE PLAN

1240

DWG. NO. AR-02

REVISION REV. 0

SHEET NO. 43


(N) EXPANSION OR ADHESIVE ANCHOR TO (E) CONCRETE SLAB W/ MIN. 4" EMBED (TYP.)
(E) CONCRETE SLAB
(N) 1/4" BENT PLATE W/ MIN. 1-3/8"ø A307 BOLT EA. END (TYP.)
1
1
1
1
(N) MIN. 3/8"ø A307 BOLT CONNECTING LONGITUDINAL AND TRANSVERSE BRACING MEMBERS @ MAX. 3'-0" O.C.
(N) BRACING (UNISTRUT, ETC.), TYP.
CONNECTION TO RACK FRAME NOT SHOWN
(N) RACK, SEE NOTE 2
(N) ANGLES EA. SIDE
(N) EXPANSION OR ADHESIVE ANCHOR TO (E) CONCERT SLAB W/ MIN. 4" EMBED (TYP.)
3 SIDES (TYP.)
1/4
(E) CONCRETE SLAB

RACK BRACING

NTS

NOTES:

1. ADHESIVES SHALL HAVE A CURRENT REPORT FROM ICC EVALUATION SERVICES IN ACCORDANCE WITH ACCEPTANCE CRITERIA AC 308.
2. EQUIPMENT RACK SHALL MEET SEISMIC LOAD RESISTING REQUIREMENTS WITH IMPORTANCE FACTOR = 1.5.

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

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RECOMMENDED
APPROVED
DATE 10/01/2009

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CITY AND COUNTY OF SAN FRANCISCO
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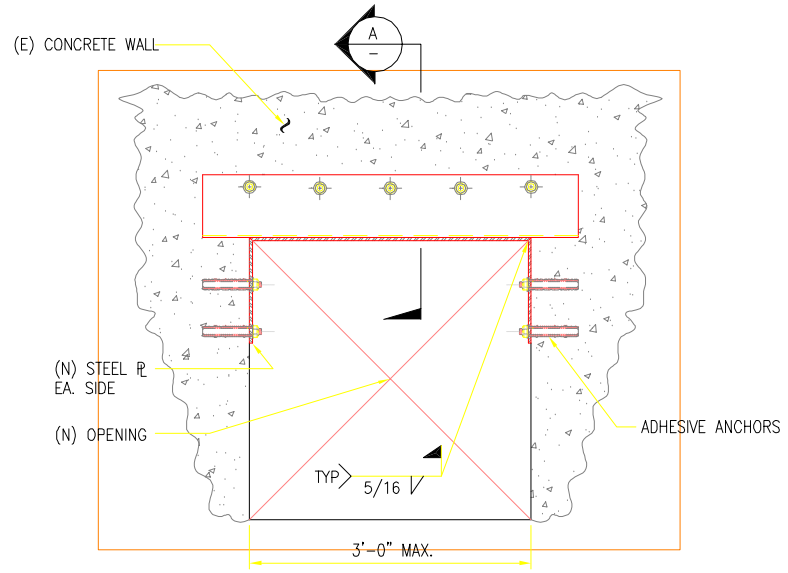
RADIO SYSTEM REPLACEMENT PROJECT

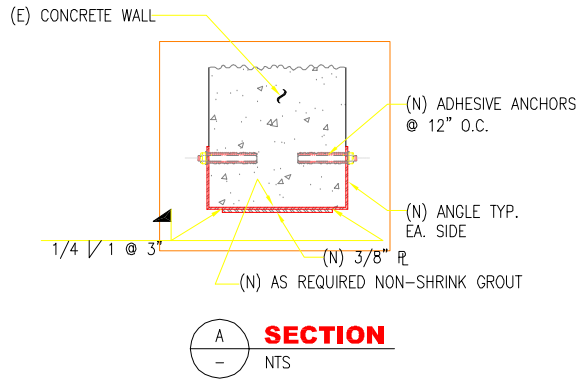
1240

TYPICAL DETAILS
RACK BRACING

DWG. NO. CV-03
REVISION REV. A
SHEET NO. 34



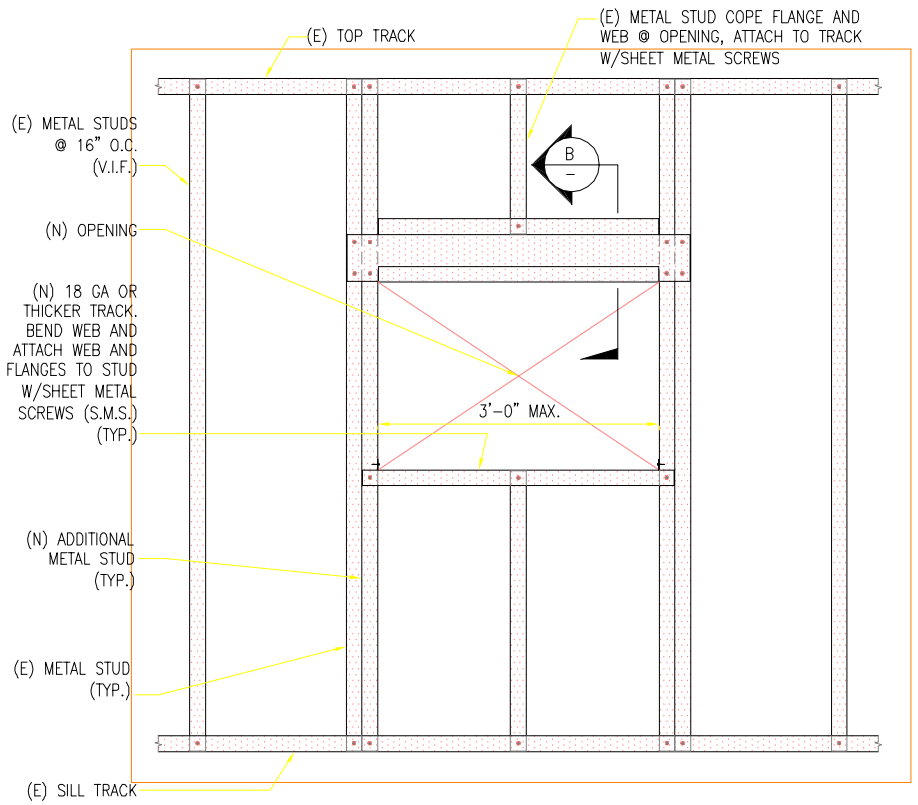
1 – **TYPICAL LINTEL @ CONCRETE WALL OPENING 3'-0" MAX. OPENING**
NTS



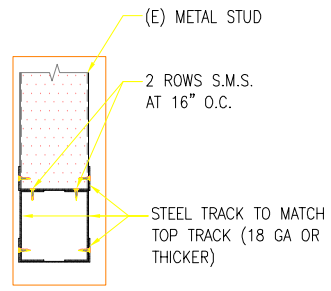
A – **SECTION**
NTS

NOTES:

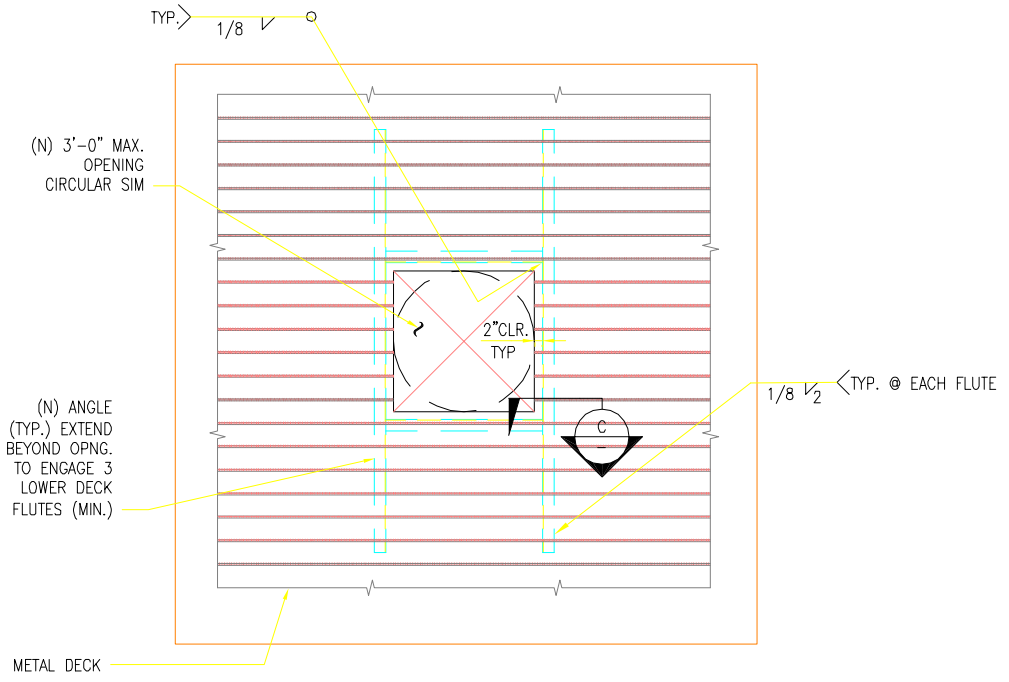
1. ADHESIVES SHALL HAVE A CURRENT REPORT FROM ICC EVALUATION SERVICES IN ACCORDANCE WITH ACCEPTANCE CRITERIA AC 308.
2. SUBMIT PROPOSED OPENING DETAILS NOT COVERED FOR ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.



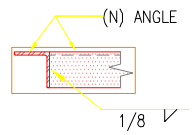
2 – **TYPICAL EXTERIOR OPENING FRAMING AT METAL STUD WALL**
NTS
(INTERIOR WALL SIM.)



B – **SECTION**
NTS



3 – **TYPICAL METAL DECK OPENING REINFOCED 3'-0" MAX. OPENING**
NTS



C – **SECTION**
NTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

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REVIEWED
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APPROVED
DATE 10/01/2009

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CITY AND COUNTY OF SAN FRANCISCO
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RADIO SYSTEM REPLACEMENT PROJECT

1240

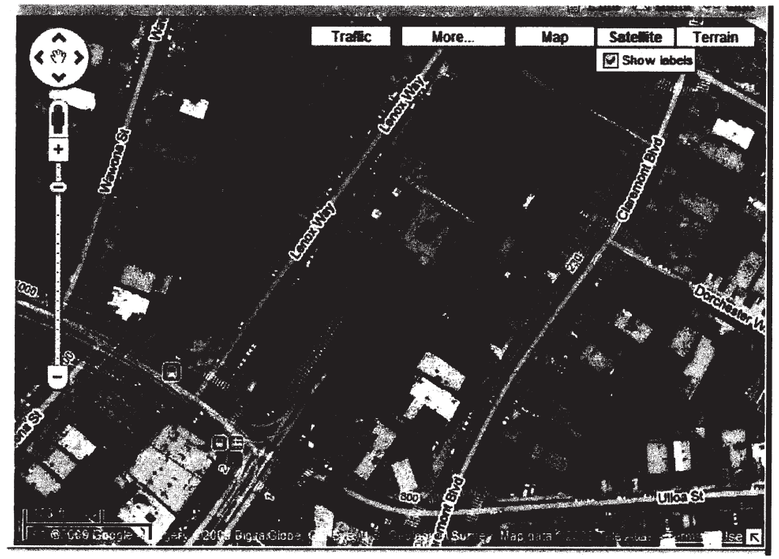
TYPICAL DETAILS
OPENING FOR DUCT AND RACEWAY

DWG. NO. CV–02
SHEET NO. 33
REVISION REV. A

BORDER REVISED 11/17/05

GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
3. The "35% Design", as presented, does not include the consequences of further and necessary design work that may include: subsoil investigation, structural analysis, tower structural analysis, seismic considerations, thermal management calculations, electrical load calculations, etc.
4. See "SCOPE OF WORK" on this sheet for further information.
5. The Contractor shall not start construction prior to receiving final, written approval on the resulting design.
6. The information contained in these drawings is accompanied by and supported by the Radio Replacement Project, 35% Design Specification Appendix 12, Section 5.
7. The information in these drawings is schematic in nature. It is intended to convey an outline of a desired result. The information and dimensions shall not be taken as absolute.
8. The Contractor shall be responsible for making it's own observations and measurements.
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.



SITE DESCRIPTION

The existing Control Room is located in proximity to the West Portal of the subway line. It is referred to as the Lenox Ave. Site. The Control Room is at the center of a control complex that provides infrastructure support to control operations. The Control Room shall be renovated without interruption of vital service. Part of the personnel now in the Control Room will be relocated prior to the start of the renovation work. Demolition and reconstruction shall be completed with a minimum of disruption to site personnel and disruption to Control Room operations. Access to the computer room via the Control Room shall not be blocked. This work shall be carried out in a manner described in the 35% Design Specification.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		8/17/09
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Back Checker		
Verifier		

SCOPE OF WORK

35% Specification Appendix 12, Section 5.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Verified Doc. Mgt	11/12/09
Verifier		

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Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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DESIGNED	FJS
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APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
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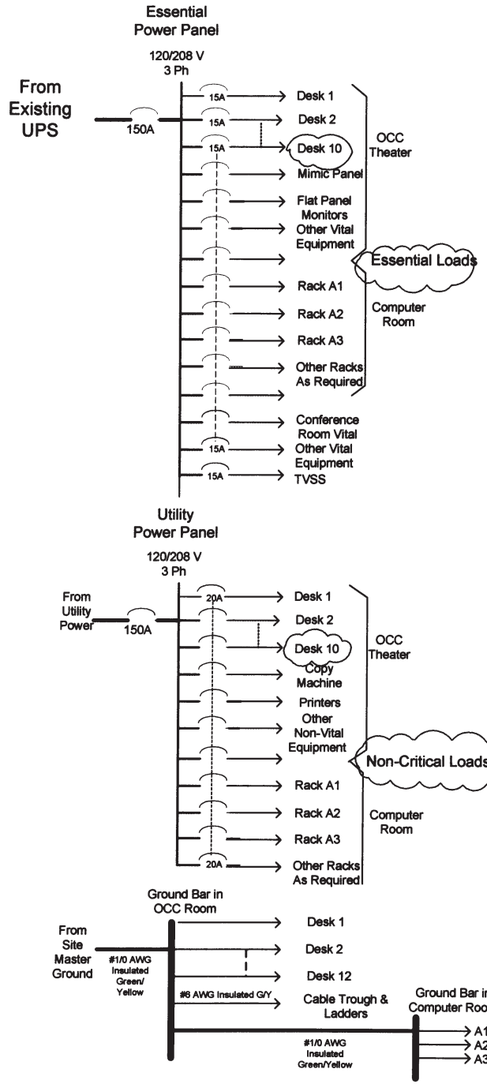
RADIO SYSTEM REPLACEMENT PROJECT

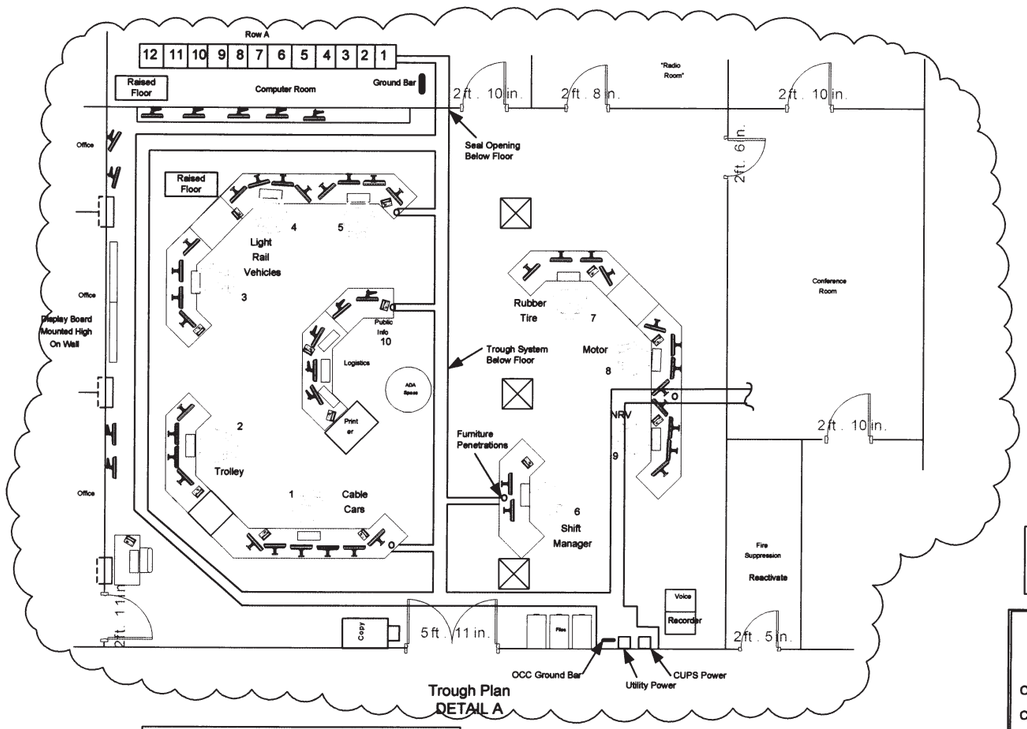
LENNOX WAY
COVER SHEET

1240

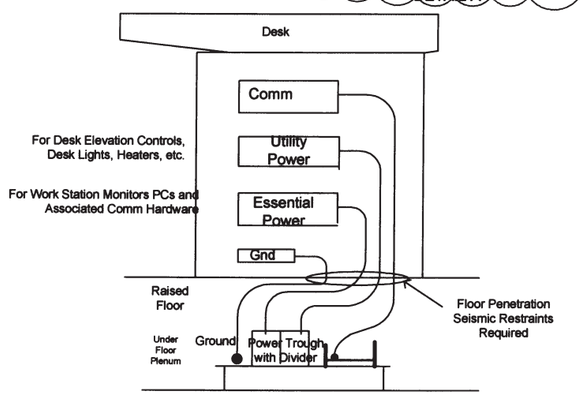
DWG. NO.	REVISION
G-06	REV. 0
SHEET NO. 50	



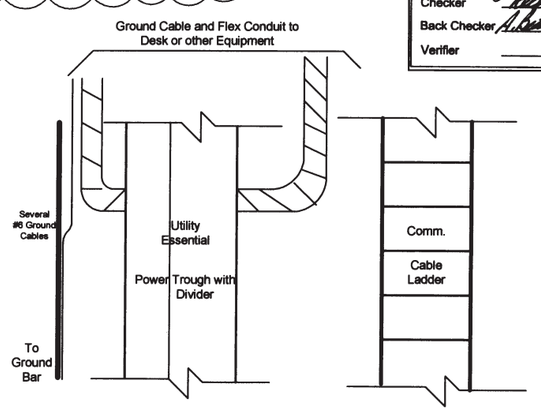
Power and Grounding Single Line



Trough Plan
DETAIL A



Trough System Elevation
DETAIL B



Trough System Plan View
DETAIL C

NOT FOR CONSTRUCTION

NOT TO SCALE

Note:
Comply with NEC criteria on flex cable length and trough size.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

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Frank J. Smith, PE, # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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for the EXECUTIVE DIRECTOR / CEO

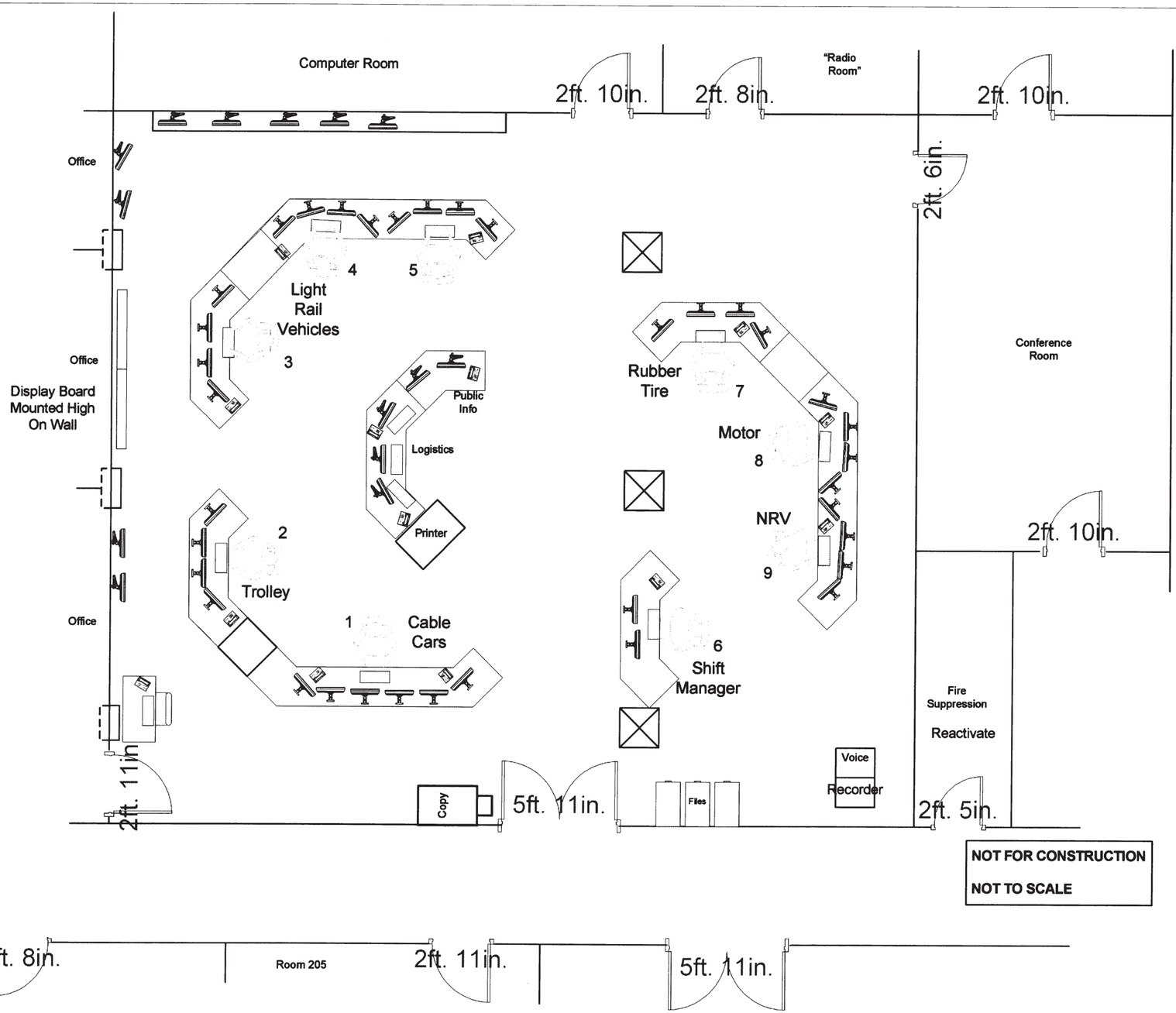
RADIO SYSTEM REPLACEMENT PROJECT

LENNOX WAY
CONTROL ROOM ELECTRICAL & GROUNDING

1240

DWG. NO. EL-04 | REVISION

SHEET NO. 56 | REV. 0



NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
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Back Checker		11/12/09
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E14042
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CITY AND COUNTY OF SAN FRANCISCO
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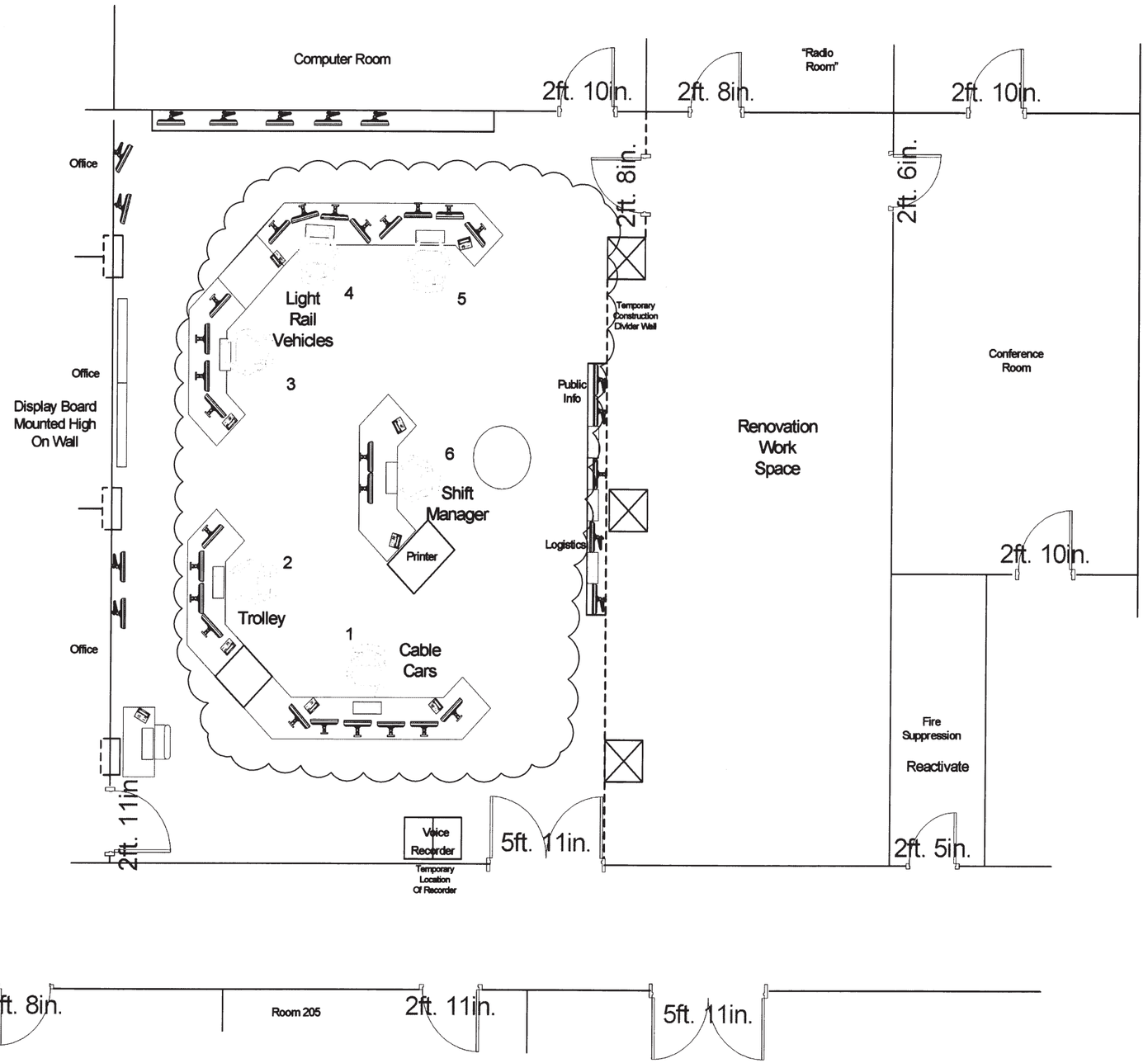
RADIO SYSTEM REPLACEMENT PROJECT

LENNOX WAY
FINAL CONTROL ROOM PLAN

1240

DWG. NO. AR-08
REVISION
SHEET NO. 55
REV. 0



NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

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Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
Verifier		

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REVIEWED	
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MUNICIPAL TRANSPORTATION AGENCY

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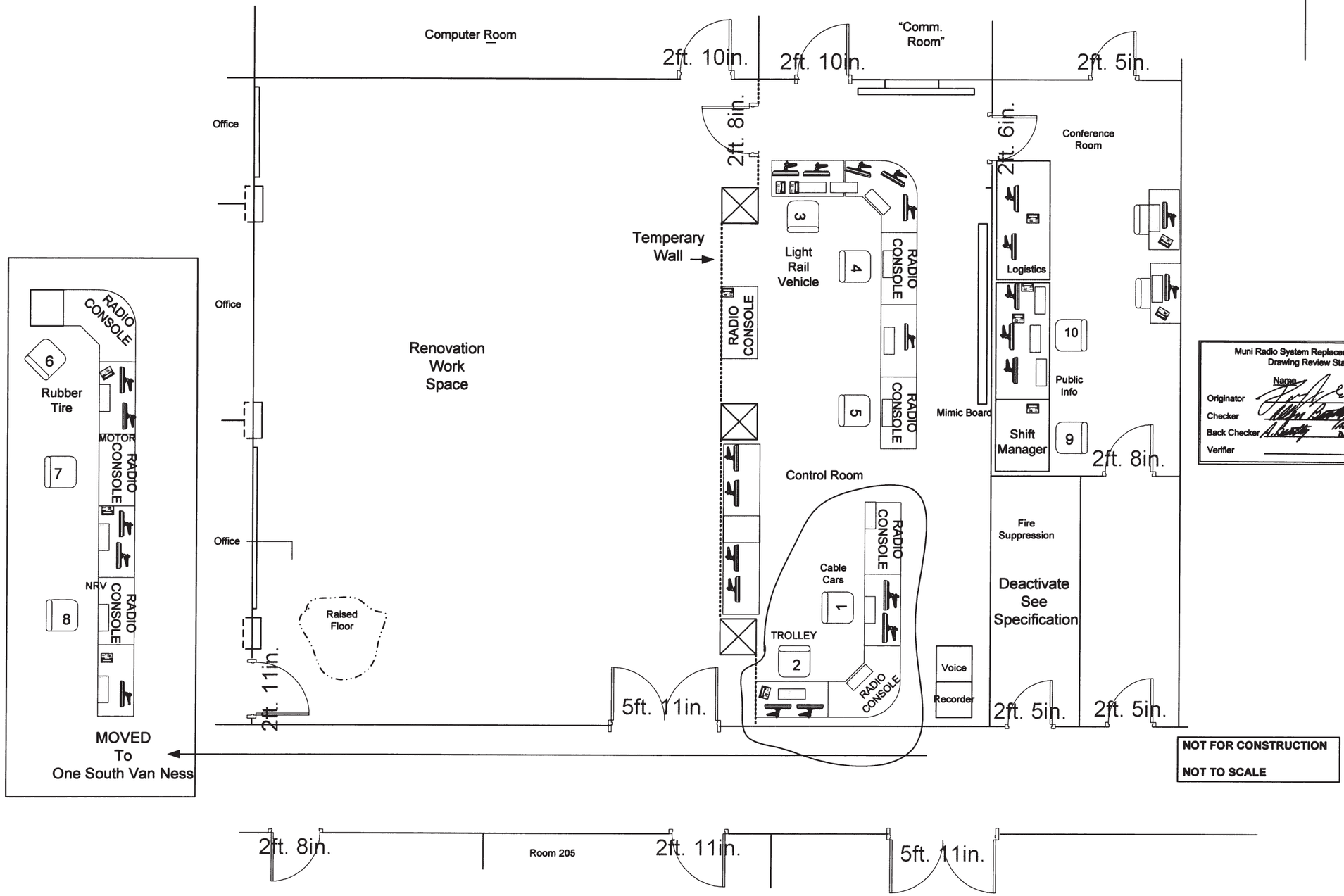
RADIO SYSTEM REPLACEMENT PROJECT

LENNOX WAY
CONSTRUCTION CONDITIONS B

1240

DWG. NO.	REVISION
AR-07	REV. 0
SHEET NO. 54	



Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
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NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
Exp. 8/31/10
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is current and obsolete and based on best available information at a 30% completion Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
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REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

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MUNICIPAL TRANSPORTATION AGENCY

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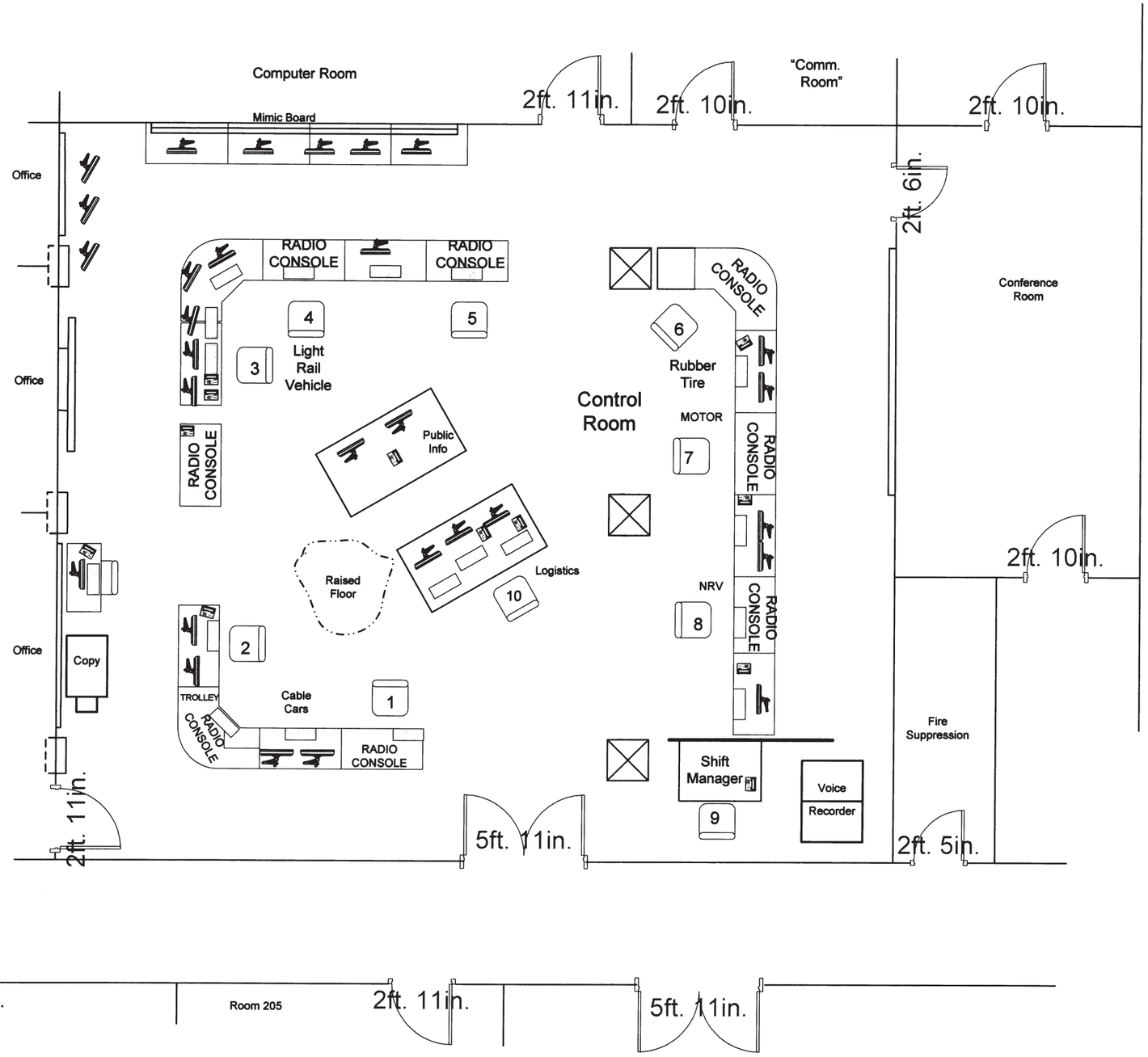
RADIO SYSTEM REPLACEMENT PROJECT

LENNOX WAY
CONSTRUCTION CONDITIONS A

DWG. NO.	REVISION
AR-06	REV. 0
SHEET NO. 53	



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Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
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Back Checker	Acting Asst. Mgr.	11/12/09
Verifier		

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Frank J. Smith, P.E. #E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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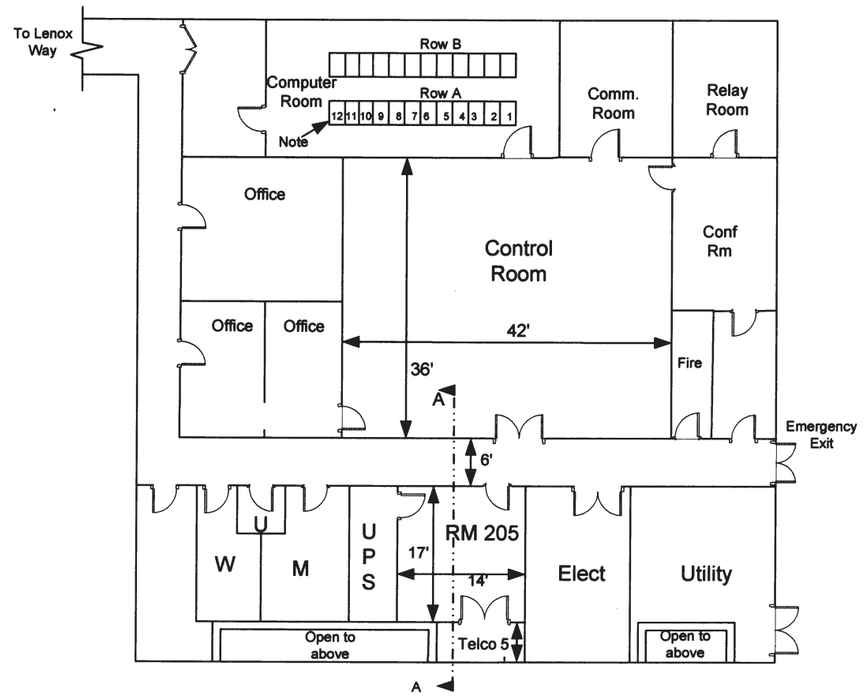
RADIO SYSTEM REPLACEMENT PROJECT

LENNOX WAY
CONTROL ROOM EXISTING CONDITIONS

1240

DWG. NO.	REVISION
AR-05	REV. 0
SHEET NO. 52	



DETAIL A
Lenox Way Site Plan

NOT FOR CONSTRUCTION

NOT TO SCALE

Notes:

Racks 5 through 10 are available for use for OCC electronics.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
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Back Checker	Acting Dep. Dir.	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
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B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith, PE, # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
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ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document was prepared by me or under my direct supervision and based on best available information at a 30% completed Radio Replacement Infrastructure design.

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RADIO SYSTEM REPLACEMENT PROJECT

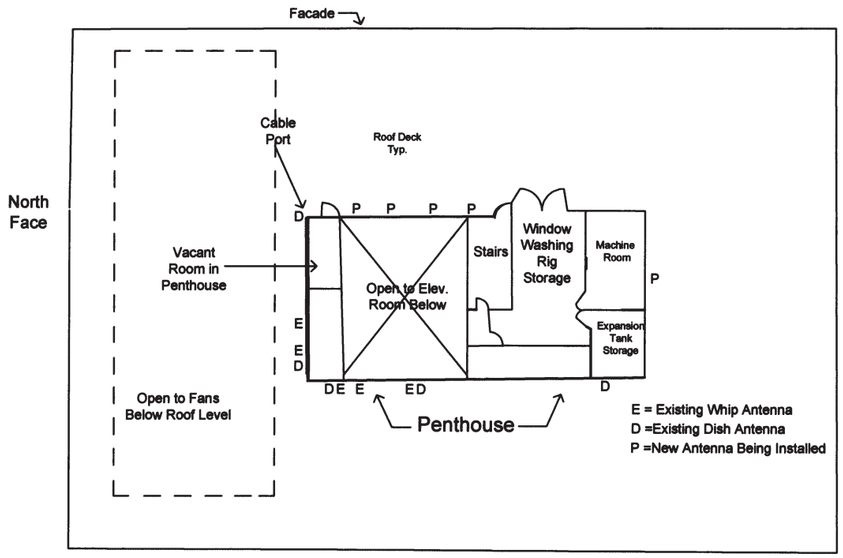
LENNOX WAY
SITE PLAN
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

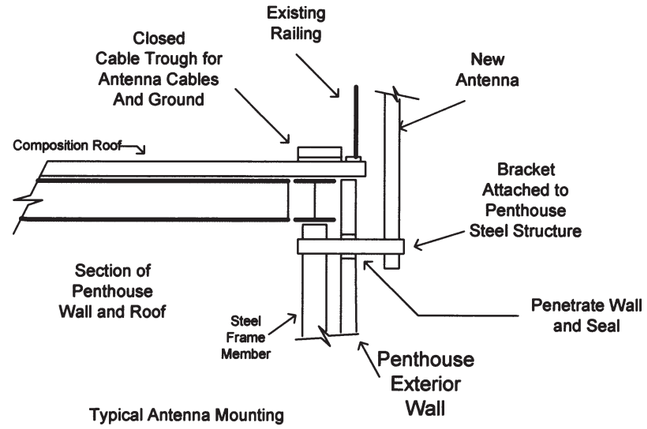
DWG. NO. AR-04

REVISION REV. 0

SHEET NO. 51

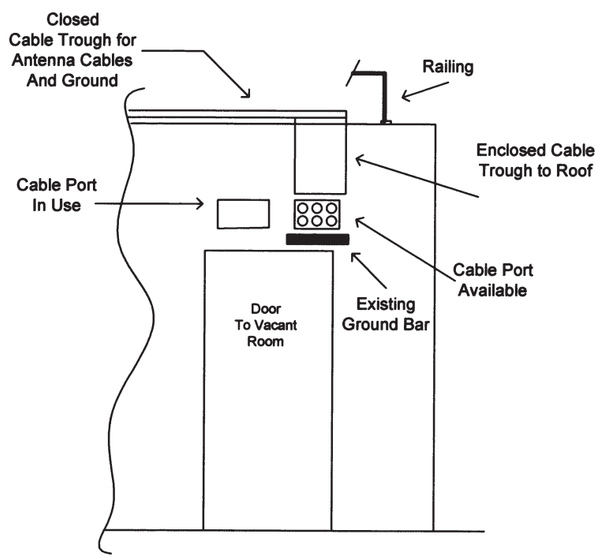


Spear Tower Roof
DETAIL A


Existing Railing
Closed Cable Trough for Antenna Cables And Ground
New Antenna
Composition Roof
Bracket Attached to Penthouse Steel Structure
Section of Penthouse Wall and Roof
Penetrate Wall and Seal
Steel Frame Member
Penthouse Exterior Wall

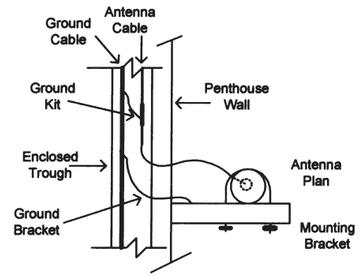
Typical Antenna Mounting

DETAIL B


Closed Cable Trough for Antenna Cables And Ground
Railing
Enclosed Cable Trough to Roof
Cable Port In Use
Cable Port Available
Door To Vacant Room
Existing Ground Bar

Elevation of
North East Corner
Of Penthouse

DETAIL C



Plan View Antenna Mount and Ground

DETAIL D

NOT FOR CONSTRUCTION

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Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
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REVISIONS

Frank J. Smith, PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

ONE MARKET PLAZA
ANTENNA ARRANGEMENT

1240

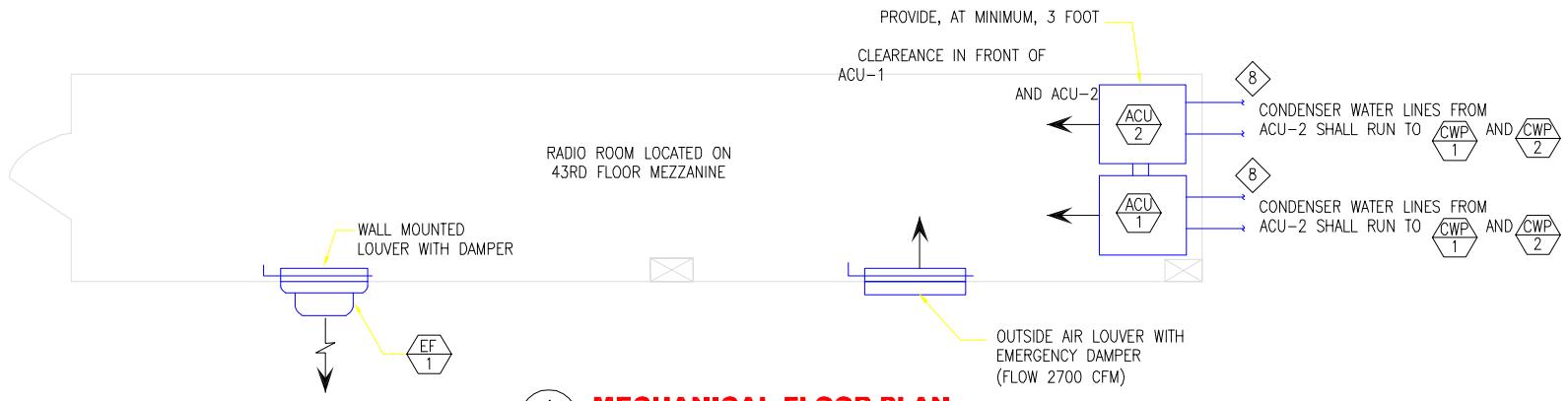
DWG. NO.	REVISION
ME-27	REV. 0
SHEET NO. 60	

LEGEND

- (1) REFERENCE NOTE
- SUPPLY AIR
- EXHAUST AIR
- AIR DAMPER

ABBREVIATIONS

\pt0.75;ACU AIR CONDITIONING UNIT
BTUH BRITISH THERMAL UNIT PER HOUR
CFM CUBIC FEET MINUTE
CWP CONDENSER WATER PUMP
DB DRY BULB TEMPERATURE
DBI SAN FRANCISCO DEPARTMENT OF BUILDING INSPECTION
DDC DIRECT DIGITAL CONTROL
EF EXHAUST FAN
ESP EXTERNAL STATIC PRESSURE
F FAHRENHEIT
GPM GALLONS PER MINUTE
HP HORSEPOWER
HZ HERTZ
NTS NOT TO SCALE
O&M OPERATION AND MAINTENANCE
SCADA SUPERVISORY CONTROL AND DATA ACQUISITION
SFMTA SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY
V VOLTS
WB WET BULB TEMPERATURE
WG WATER GAUCE



1/– MECHANICAL FLOOR PLAN
NTS

NOTES:

1. PRIOR TO SUBMITTAL OF BIDS, CONTRACTOR SHALL VISIT THE JOB TO VERIFY EXISTING CONDITIONS WHICH IMPACT THE DESIGN, DEMOLITON AND CONSTRUCTION REQUIREMENTS UNDER THIS CONTRACT.
2. ALL HVAC EQUIPMENT (I.E., AIR CONDITIONING UNITS, PUMPS, AND FAN) SHALL COMPLY WITH THE LATEST EDITION OF THE CITY AND COUNTY OF SAN FRANCISCO MECHANICAL CODE AND CALIFORNIA ENERGY EFFICIENCY STANDARD, TITLE 24. CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND FUNCTIONAL HVAC SYSTEM AND DDC SYSTEM. CONTRACTOR SHALL COMPLETE AND SIGN ALL REQUIRED TITLE 24 DOCUMENTATION.
3. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL. SHOP DRAWING SHALL INCLUDE, BUT NOT LIMITED TO: THE LAYOUT PLAN SHOWING AIR CONDITIONING UNITS, CONDENSER PUMPS, FAN, LOUVERS, PIPING, VALVES, WATER HAMMER, REQUIRED CONDUIT AND WIRING; CONTROL DIAGRAMS AND DETAILS OF DDC SYSTEM; MOUNTING DETAILS FOR PIPING AND HVAC EQUIPMENT; TITLE 24 DOCUMENTATION; UL CERTIFICATION FOR EQUIPMENT FURNISHED; AND PIPING SYSTEM DESIGN CALCULATIONS APPROVED BY A PROFESSIONAL MECHANICAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA. PIPING SYSTEM DESIGN CALCULATIONS SHALL ALSO INCLUDE, BUT NOT LIMITED, TO THE FOLLOWING SIZING: (1) PIPES; (2) CONDENSER WATER PUMPS; AND (3) LOUVERS.
   CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY WALL REGISTER AND DAMPER TO THE RADIO ROOM EXISTING AIR DUCTS (IF APPLICABLE) IN ORDER TO OBTAIN A FUNCTIONAL AND UNIFIED HVAC SYSTEM. THE FIRE CONTROL PANEL SHALL SHUT THESE DAMPERS, WHEN SMOKE IS DETECTED IN THE RADIO CONTROL ROOM. THE CONTRACTOR SHALL MODIFY, IF NECESSARY, THE EXISTING SUPPLY AND RETURN AIR DUCTS TO INSTALL THESE LOUVERS AND DAMPERS.
4. CONTRACTOR SHALL COORDINATE LOCATION OF EQUIPMENT, PIPE RUNS, AND CONDUIT RUNS WITH THE BUILDING MANAGEMENT AT ONE MARKET PLAZA. LAYOUT PLAN SHALL REFLECT INPUT FROM BUILDING MANAGEMENT AT ONE MARKET PLAZA.
5. CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DESIGN CALCULATIONS FOR EQUIPMENT AND PIPING SUPPORT SYSTEMS. THE SUPPORT SYSTEM SHALL INCLUDE BOTH DEAD LOAD AND SEISMIC LOAD. CALCULATIONS AND DRAWINGS SHALL BE PREPARED AND STAMPED BY A LICENSED CALIFORNIA STRUCTURAL PROFESSIONAL ENGINEER FOR DBI'S REVIEW AND APPROVAL. CONTRACTOR SHALL MARK ON THE LAYOUT DRAWINGS THE APPROXIMATE LOCATIONS TO THE SUPPORT POINTS AND TYPE OF SUPPORTS WITH SEISMIC RESTRAINTS TO BE USED.
6. ALL SEISMIC DESIGN DOCUMENTS SHALL BE SUBMITTED AND APPROVED BY DBI PRIOR TO INSTALLATION.
7. CONTRACTOR SHALL PROVIDE TRAINING TO SFMTA PERSONNEL ON THE USE AND MAINTENANCE OF THE HVAC EQUIPMENT AND DDC SYSTEM; AND THE INTERACTION BETWEEN RADIO ROOM HVAC SYSTEM, DDC SYSTEM, AND FIRE PROTECTION SYSTEM. CONTRACTOR SHALL PROVIDE TRAINING MATERIALS AND O&M MANUALS. CONTRACTOR SHALL PROVIDE TWO TRAINING SESSIONS UP TO FOUR HOURS EACH: ONE TRAINING SESSION FOR OPERATING PERSONNEL AND THE OTHER TRAINING FOR MAINTENANCE STAFF. O&M MANUALS SHALL INCLUDE A COMPLETE PART LIST AND LIST OF RECOMMENDED SPARE PARTS.
8. CWP–1 AND CWP–2 SHALL BE LOCATED IN THE MECHANICAL ROOM ON THE 43RD FLOOR.

EQUIPMENT SCHEDULE

EQUIPMENT TAG	DESCRIPTION
ACU 1 AND ACU 2	AIR CONDITIONING UNIT: PACKAGED VERTICAL DRAW THRU UNIT CONSISTING OF DIRECT EXPANSION COOLING COIL, CENTIFUGAL BLOWER WITH HIGH EFFICIENCY MOTOR, UPFLOW AIR DISCHARGE, SINGLE POINT POWER CONNECTION, ADVANCED MICROPROCESSOR WITH GRAPHICS, SOUND ATTENUATED CABINET, FACTOR MOUNTED DISCONNECT SWITCH AND SMOKE DETECTOR AT RETURN AIR INLET. PERFORMANCE SHALL BE FOR A 64,600 BTUH TOTAL COOLING CAPACITY, 54,900 BTUH SENSIBLE COOLING CAPACITY WITH ENTERING AIR TEMPERATURE OF 75 DEGREES F DB, 62.5 DEGREES F WB WITH 3000 CFM @0.3 W.G. ESP AND 18.0 GPM CONDENSER WATER WITH ENTERING TEMPERATURE OF 85 DEGREES F. AND 95 DEGREES F LEAVING. UNIT SHALL BE U.L. LISTED, FACTORY TESTED AND ASSEMBLED. \pt1.5,3.875,5.875;MANUFACTURER: LIEBERT INDOOR FAN MOTOR: 2 HP \pt1.5,3.875,5.875,7;MODEL NUMBER: BU071WG–CG0I UNIT WEIGHT: 710 LBS \pt1.5,3.875,6.25,6.5;ELECTRICAL: 208 V/60 HZ/3 PHASE
CWP 1 AND CWP 2	CONDENSER WATER PUMP: IN–LINE CENTRIFUGAL PUMP WITH CAPACITY OF 18 GPM AND 3/4 HP MOTOR. PUMP SHALL BE BRONZE FITTED. THE PUMP SHALL CIRCULATE WATER FROM THE BUILDING COOLING TOWER AND ACU–1 AND ACU–2. MOUNT PUMPS ON SUPPORT STANDS.
EF 1	SIDE WALL EXHAUST FAN BELT DRIVE FOR 2,700 CFM AT 0.3 ESP, 665 RPM, PROVIDE FAN W/LOW LEAKAGE GRAVITY BACK DAMPER, GALVANIZED BIRD SCREEN, AND NEMA RATED DISCONNECT SWITCH. \pt1.5,3.875,5.875;MANUFACTURER: GREENHECK ELECTRICAL: 208 V/60 HZ/ 1 PHASE MODEL NUMBER: CWB–200 FAN MOTOR: 1/3 HP

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	DESCRIPTION		JP	RG

REVISIONS

DESIGNED
DRAWN
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REVIEWED
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APPROVED
DATE 10/01/2009

No. M32337
Exp. 6-30-2011

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

ONE MARKET PLAZA
MECHANICAL PLAN

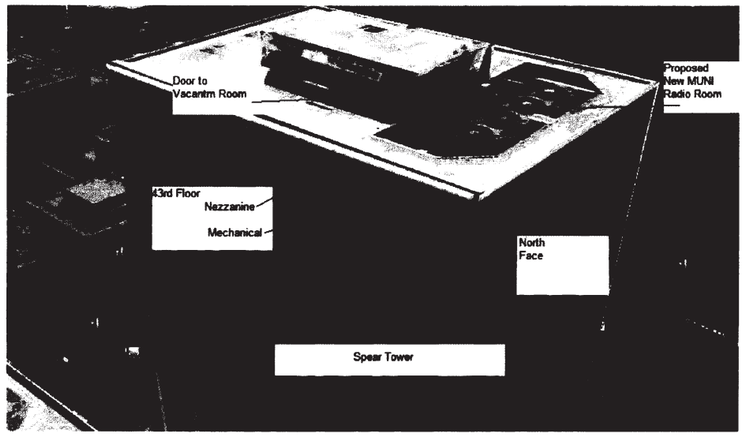
1240

DWG. NO. ME–24
REVISION REV. 0
SHEET NO. 63

BORDER REVISED 11/17/05

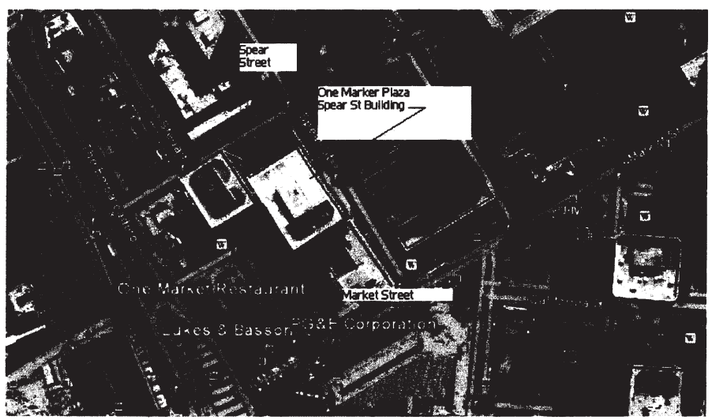
GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
3. The "35% Design", as presented, does not include the consequences of further and necessary design work that may include: subsoil investigation, structural analysis, tower structural analysis, seismic considerations, thermal management calculations, electrical load calculations, etc.
4. See "SCOPE OF WORK" on this sheet for further information.
5. The Contractor shall not start construction prior to receiving final, written approval on the resulting design.
6. The information contained in these drawings is accompanied by and supported by the Radio Replacement Project, 35% Design Specification Appendix 12, Section 5.
7. The information in these drawings is schematic in nature. It is intended to convey an outline of a desired result. The information and dimensions shall not be taken as absolute.
8. The Contractor shall be responsible for making it's own observations and measurements.
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.



SITE DESCRIPTION

This site is located in an existing room on the 43rd Floor mezzanine, in the north east corner of the Spear Building of the One Market Street complex. The building is located on Spear Street just south of Market Street near the Ferry Terminal. This is above the 43rd floor mechanical space and below the penthouse. The antennas are mounted on the penthouse walls. The room is accessible by freight elevator and then by two flights of stairs in an open stair well. The power for the room is taken from a new generator located in the basement of the adjoining Steuart Building. The site has wet sprinklers and will be provided with a pre-action FM-200 fire suppression system. The site is full of radio equipment that will be removed by others.



SCOPE OF WORK

35% Specification Appendix 12, Section 5.

Muni Radio System Replacement Project
Drawing Review Stamp

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Originator		11/12/09
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Back Checker		11/12/09
Verifier		

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REVISIONS

Frank J. Smith PE # E14042 — REGISTERED PROFESSIONAL ENGINEER — FRANK J. SMITH — E14042 — ELECTRICAL — STATE OF CALIFORNIA — November 24, 2009

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RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
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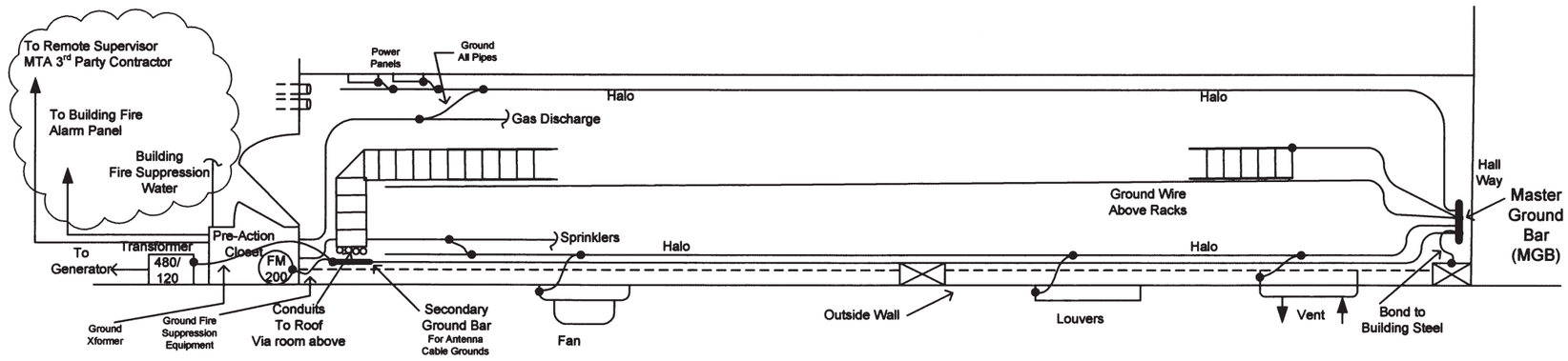
RADIO SYSTEM REPLACEMENT PROJECT

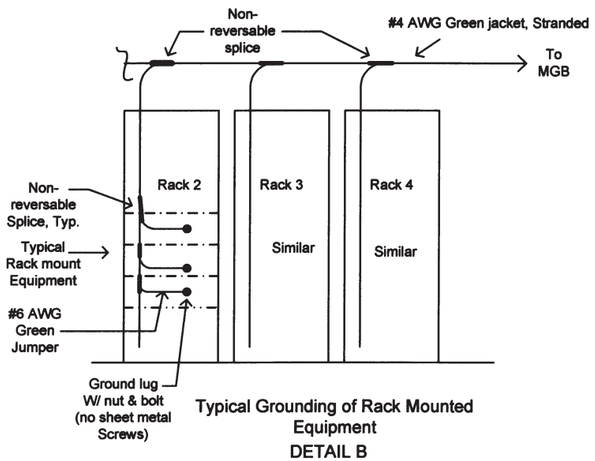
ONE MARKET PLAZA
COVER SHEET

1240

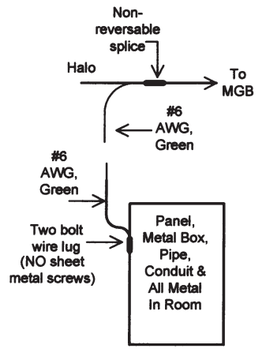
DWG. NO.	REVISION
G-07	REV. 0
SHEET NO. 57	



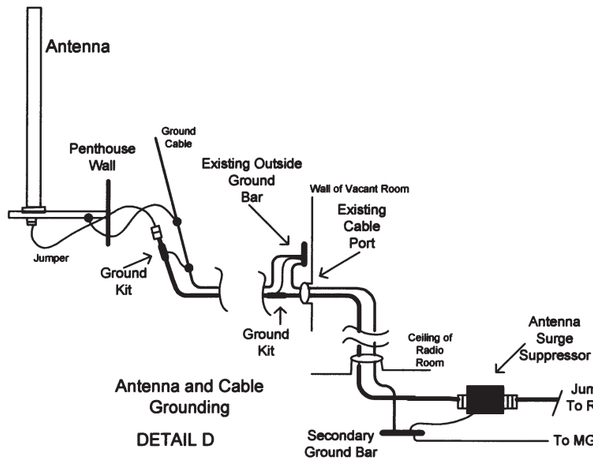
Proposed Radio Room Plan
43rd Floor Mezzanine
DETAIL A



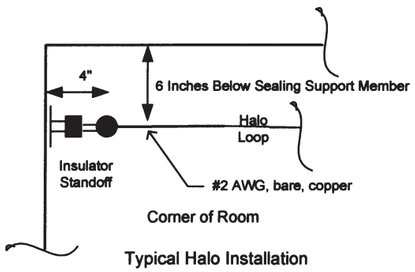
Typical Grounding of Rack Mounted Equipment
DETAIL B



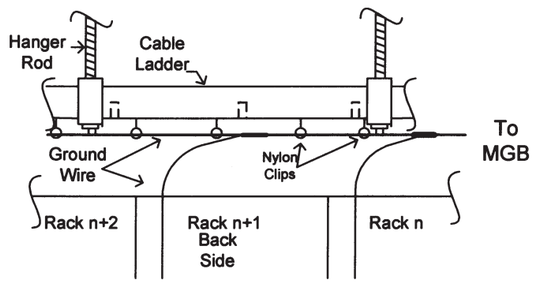
Typical Box Grounding
DETAIL C



Antenna and Cable Grounding
DETAIL D



Typical Halo Installation
DETAIL E



Elevation of Space Above New Racks
DETAIL F

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

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Originator		11/12/09
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A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith, PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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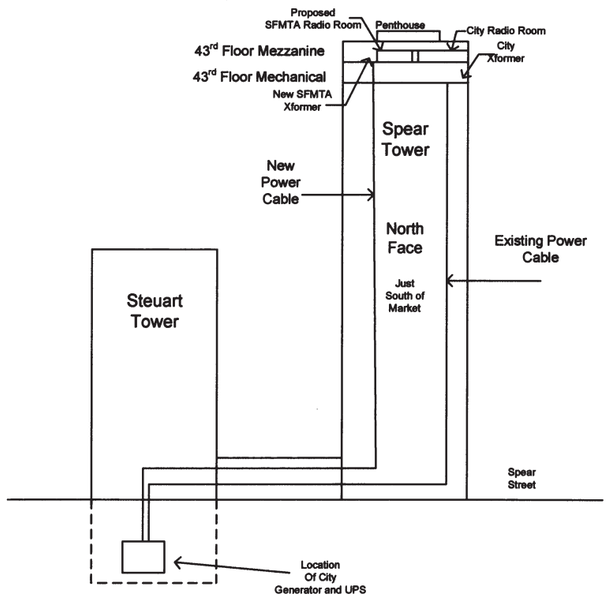
RADIO SYSTEM REPLACEMENT PROJECT

1240

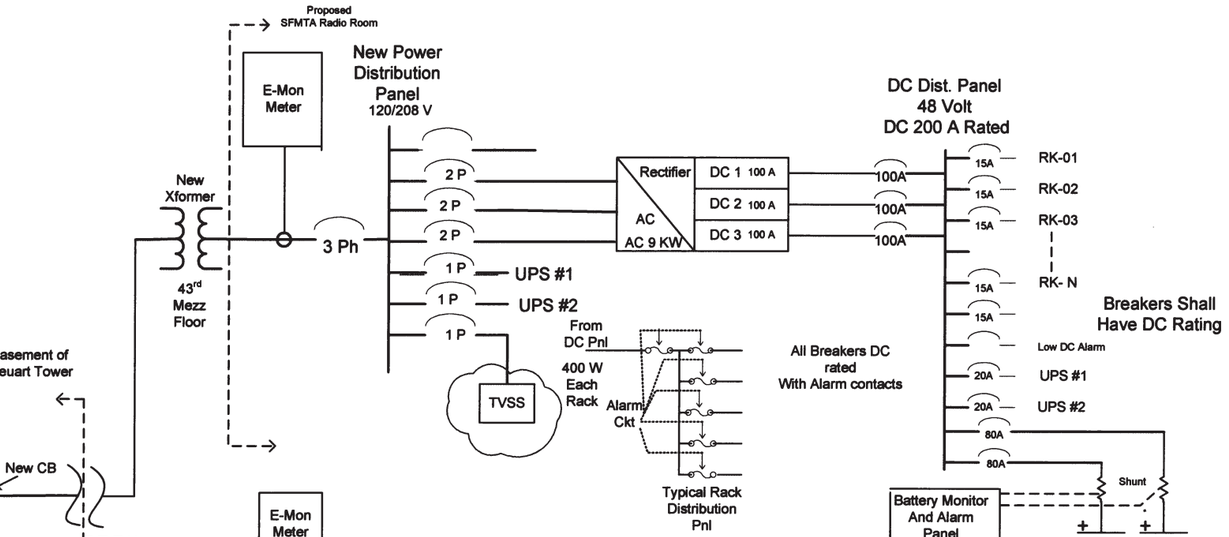
ONE MARKET PLAZA
SITE GROUNDING

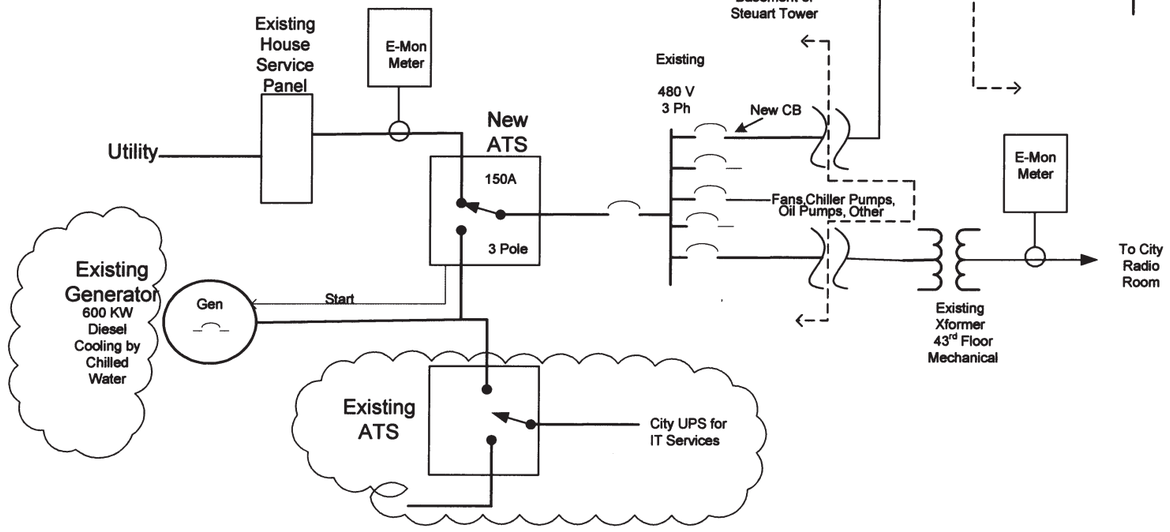
DWG. NO.	REVISION
EL-06	REV. 0
SHEET NO. 62	



One Market Plaza
Elevation

DETAIL A





Single Line Diagram

DETAIL B

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RC
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
Exp. 9/30/2010
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is current and includes and based on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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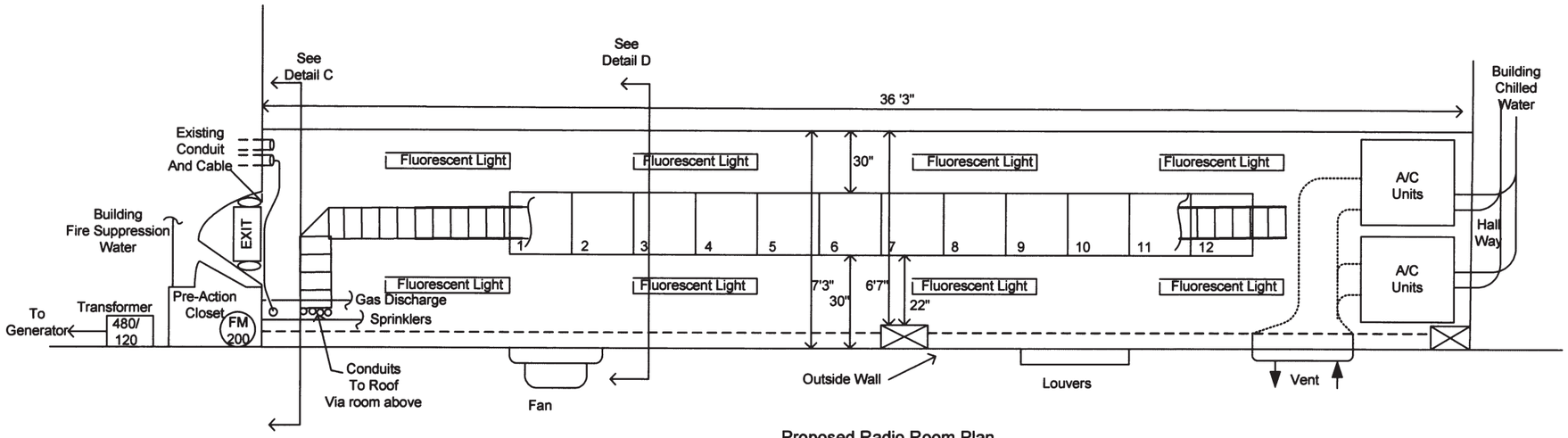
for the EXECUTIVE DIRECTOR / CED

1240

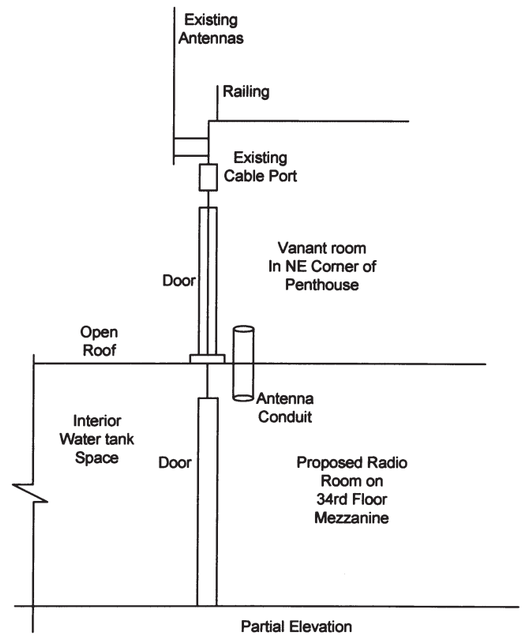
RADIO SYSTEM REPLACEMENT PROJECT

ONE MARKET PLAZA
SITE ELECTRICAL

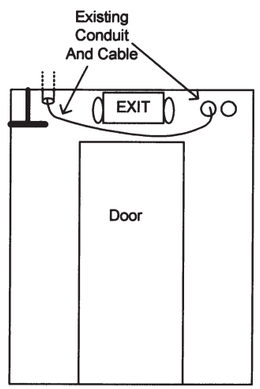
DWG. NO.	REVISION
EL-05	REV. 0
SHEET NO. 61	



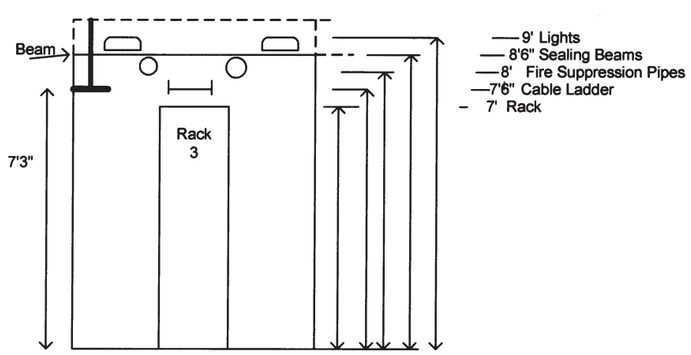
Proposed Radio Room Plan
43rd Floor Mezzanine
DETAIL A



Partial Elevation
NE corner of Penthouse
DETAIL B



Proposed Elevation of
Radio Room
DETAIL C



Proposed Elevation of
Radio Room
DETAIL D

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		01/13/09
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Back Checker		
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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MUNICIPAL TRANSPORTATION AGENCY

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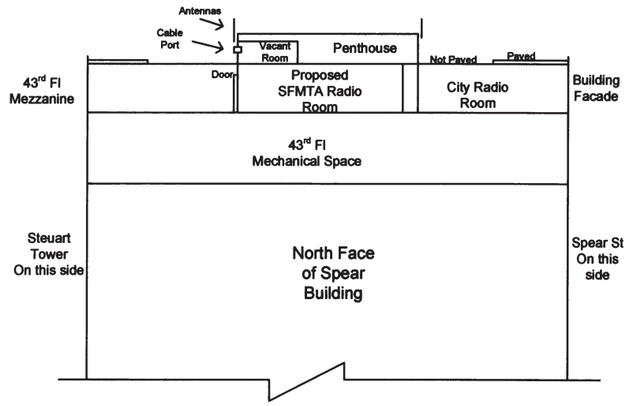
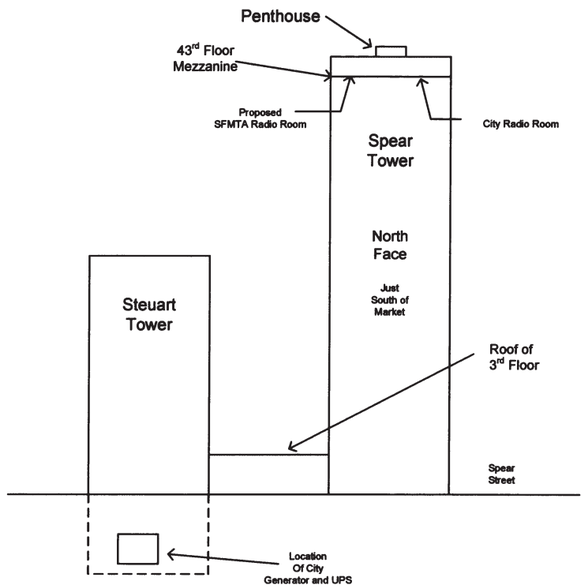
RADIO SYSTEM REPLACEMENT PROJECT

ONE MARKET PLAZA
ROOM LAYOUT PLAN & ELEVATIONS
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

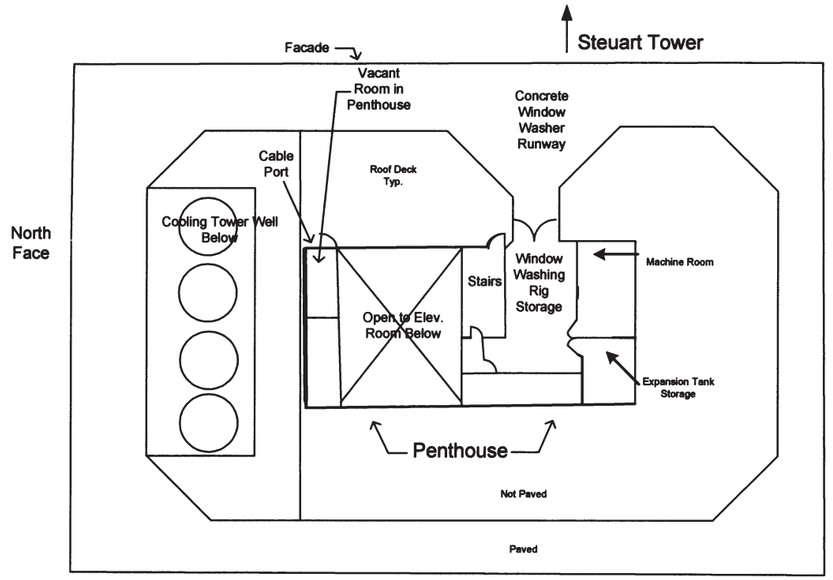
DWG. NO. AR-10
REVISION REV. 0
SHEET NO. 59



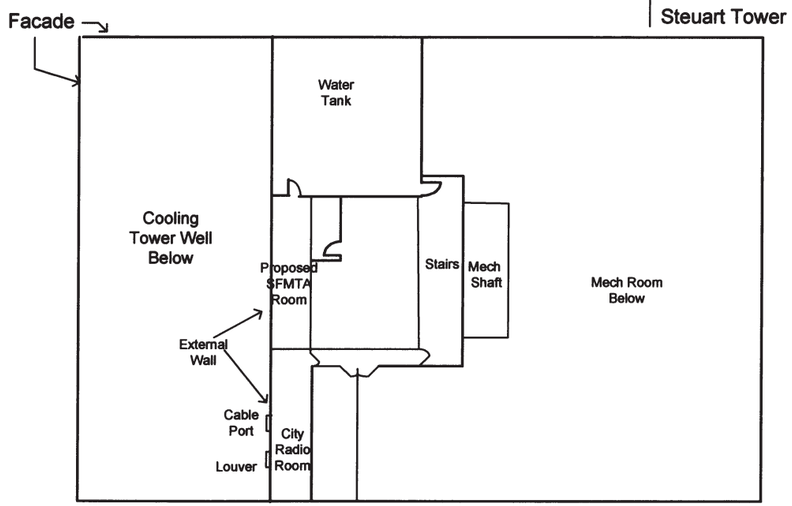
Spear Tower
Partial Elevation
DETAIL A



One Market Plaza
Elevation
DETAIL C



Spear Tower Roof Plan
With Penthouse
DETAIL B



Spear Tower
43rd Mezzanine Floor
DETAIL D

Note: The Proposed SFMTA Room is full of radio equipment that will be removed by others.
Any remaining equipment shall be removed prior to the start of reconstruction.

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	for Jim Beverly	11/12/09
Verifier		

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A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is signed and stamped and based on best available information at a 30% completed Radio Replacement Infrastructure design.

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RADIO SYSTEM REPLACEMENT PROJECT

ONE MARKET PLAZA
SITE PLAN & ELEVATIONS

DWG. NO.	REVISION
AR-09	REV. 0
SHEET NO. 58	

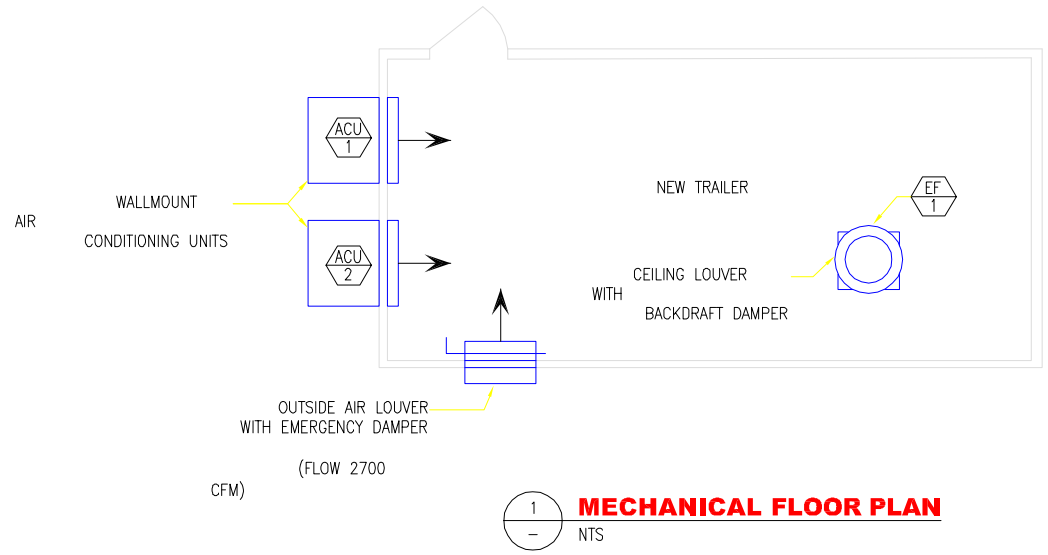
LEGEND

SUPPLY AIR

AIR DAMPER

ABBREVIATIONS

\pt0.75;ACU AIR CONDITIONING UNIT
BTUH BRITISH THERMAL UNIT PER HOUR
CFM CUBIC FEET MINUTE
DB DRY BULB TEMPERATURE
DDC DIRECT DIGITAL CONTROL
DTIS SF DEPT. OF TELECOMMUNICATIONS & INFORMATION SERVICES
EF EXAHAUST FAN
ESP EXTERNAL STATIC PRESSURE
F FAHRENHEIT
HP HORSEPOWER
HZ HERTZ
NTS NOT TO SCALE
O&M OPERATION AND MAINTENANCE
SCADA SUPERVISORY CONTROL AND DATA ACQUISTION
SF SAN FRANCISCO
SFMTA SF MUNICIPAL TRANSPORTATION AGENCY
V VOLTS
WB WET BULB TEMPERATURE
WG WATER GAUGE



1 / – **MECHANICAL FLOOR PLAN**
NTS

NOTES:

1. PRIOR TO SUBMITTAL OF BIDS, CONTRACTOR SHALL VISIT THE JOB TO VERIFY EXISTING CONDITIONS WHICH IMPACT THE DESIGN AND CONSTRUCTION REQUIREMENTS UNDER THIS CONTRACT.
2. ALL HVAC EQUIPMENT SHALL COMPLY WITH THE LATEST EDITION OF THE CITY AND COUNTY OF SAN FRANCISCO MECHANICAL CODE AND CALIFORNIA ENERGY EFFICIENCY STANDARD, TITLE 24. CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND FUNCTIONAL HVAC SYSTEM AND DDC SYSTEM. CONTRACTOR SHALL COMPLETE AND SIGN ALL REQUIRED TITLE 24 DOCUMENTATION.
3. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL. SHOP DRAWINGS SHALL BE SIGNED BY A PROFESSIONAL MECHANICAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA. SHOP DRAWING SHALL INCLUDE BUT NOT LIMITED TO: THE LAYOUT PLAN SHOWING AIR CONDITIONING UNITS, FAN, LOUVERS, THERMOSTATS, REQUIRED CONDUIT AND WIRING; CONTROL DIAGRAMS AND DETAILS OF DDC SYSTEM; MOUNTING DETAILS FOR HVAC EQUIPMENT; TITLE 24 DOCUMENTATION; UL CERTIFICATION FOR EQUIPMENT FURNISHED.
4. CONTRACTOR SHALL PROVIDE TRAINING TO SFMTA PERSONNEL ON THE USE AND MAINTENANCE OF THE HVAC EQUIPMENT AND DDC SYSTEM; AND THE INTERACTION BETWEEN THE TRAILER HVAC SYSTEM, DDC SYSTEM, AND FIRE PROTECTION SYSTEM. CONTRACTOR SHALL PROVIDE TWO TRAINING SESSIONS UP TO FOUR HOURS EACH: ONE TRAINING SESSION FOR OPERATING PERSONNEL AND THE OTHER TRAINING FOR MAINTENANCE STAFF. CONTRACTOR SHALL PROVIDE TRAINING MATERIALS AND O&M MANUALS. O&M MANUALS SHALL INCLUDE A COMPLETE PART LIST AND LIST OF RECOMMENDED SPARE PARTS.

EQUIPMENT SCHEDULE

EQUIPMENT TAG	DESCRIPTION
ACU 1 AND ACU 2	AIR CONDITIONING UNIT: PACKAGED VERTICAL WALLMOUNT UNIT CONSISTING OF DIRECT EXPANSION COOLING COIL, FORWARD CURVED CENTIFUGAL BLOWER WITH HIGH EFFICIENCY MOTOR, ADJUSTABLE SHEAVE, SINGLE POINT POWER CONNECTION. PERFORMANCE SHALL BE FOR A 53,010 BTUH TOTAL COOLING CAPACITY, 41,807 BTUH SENSIBLE COOLING CAPACITY WITH ENTERING AIR TERMPERATURE OF 74 DEGREES F DB, 63 DEGREES F WB AT 95 DEGREES F OUTSIDE TEMPERATURE (1,850 CFM AT 0.24" W.G. ESP). UNIT SHALL BE U.L. LISTED, FACTORY TESTED AND ASSEMBLED. \pt1.75,3.875,6.25,6.5;MANUFACTURER: MARVAIR OR EQUAL MODEL NUMBER: AVPA 60 ACC ELECTRICAL: 208 V/3 PHASE/60 HZ RATED LOAD AMPS: 15.6 AMPS
EF 1	CENTRIFUGAL ROOF EXHAUST FAN BELT DRIVE FOR 2,700 CFM AT 0.3 ESP, 636 RPM, PROVIDE FAN W/LOW LEAKAGE GRAVITY BACKDRAFT DAMPER, HINGE KIT, PERMA-Z COATING, GALVANIZED BIRD SCREEN, NEMA RATED DISCONNECT SWITCH, AND ROOF CURB. \pt1.5,3.875,6.125;MANUFACTURER: GREENHECK ELECTRICAL: 208 V/1 PHASE/60 HZ MODEL NUMBER: GB-200 FAN MOTOR: 1/3 HP

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

DESIGNED
DRAWN
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 10/01/2009

No. M32337 Exp. 6-30-2011

SEAL OF THE CITY AND COUNTY OF SAN FRANCISCO

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

1240

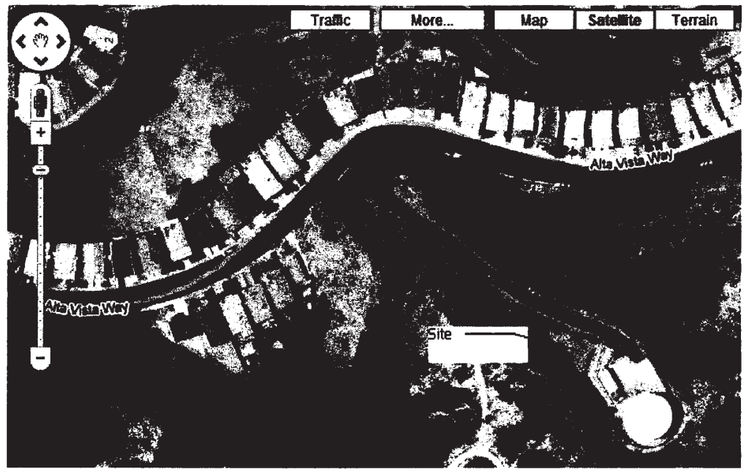
SOUTH HILL
MECHANICAL PLAN

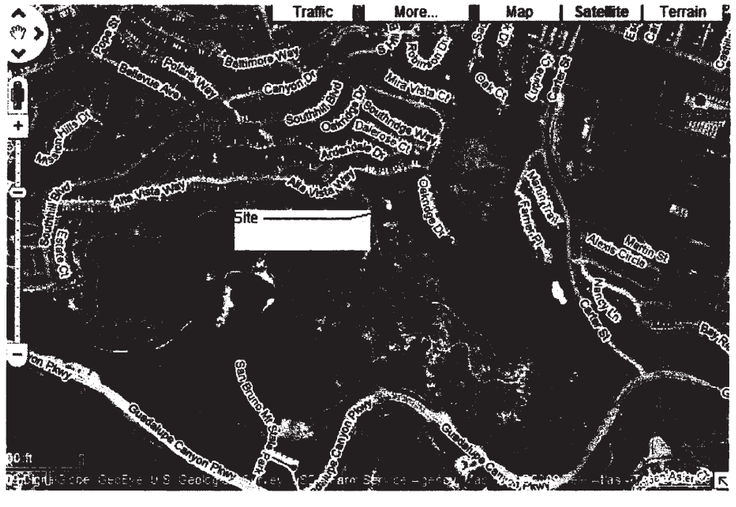
DWG. NO. ME-23
SHEET NO. 70
REVISION REV. 0

BORDER REVISED 11/17/05

GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
3. The "35% Design", as presented, does not include the consequences of further and necessary design work that may include: subsoil investigation, structural analysis, tower structural analysis, seismic considerations, thermal management calculations, electrical load calculations, etc.
4. See "SCOPE OF WORK" on this sheet for further information.
5. The Contractor shall not start construction prior to receiving final, written approval on the resulting design.
6. The information contained in these drawings is accompanied by and supported by the Radio Replacement Project, 35% Design Specification Appendix 12, Section 5.
7. The information in these drawings is schematic in nature. It is intended to convey an outline of a desired result. The information and dimensions shall not be taken as absolute.
8. The Contractor shall be responsible for making its own observations and measurements.
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.





SITE DESCRIPTION

This site is south of San Francisco and on the northern edge of San Bruno Mountain State and County Park. The site includes an existing water storage tank and an existing City radio shelter and tower. The site is fenced. The site is on the side of a hill that is steeply sloped. The site has undergone extensive reconstruction. (Information herein is based on available construction documents.) The space within the fenced site is under the supervision of the City Water Dept. Outside the fenced area is State Park land and it is considered environmentally sensitive.

SCOPE OF WORK

35% Specification Appendix 12, Section 5.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dec. Mgr	11/12/09
Verifier		

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REVISIONS

Frank J. Simonetti E14042 — REGISTERED PROFESSIONAL ENGINEER — FRANK J. RUIN — E14042 — ELECTRONIC — November 24, 2009

DESIGNED	FJS
DRAWN	DEL
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DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

SOUTH HILL
COVER SHEET
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

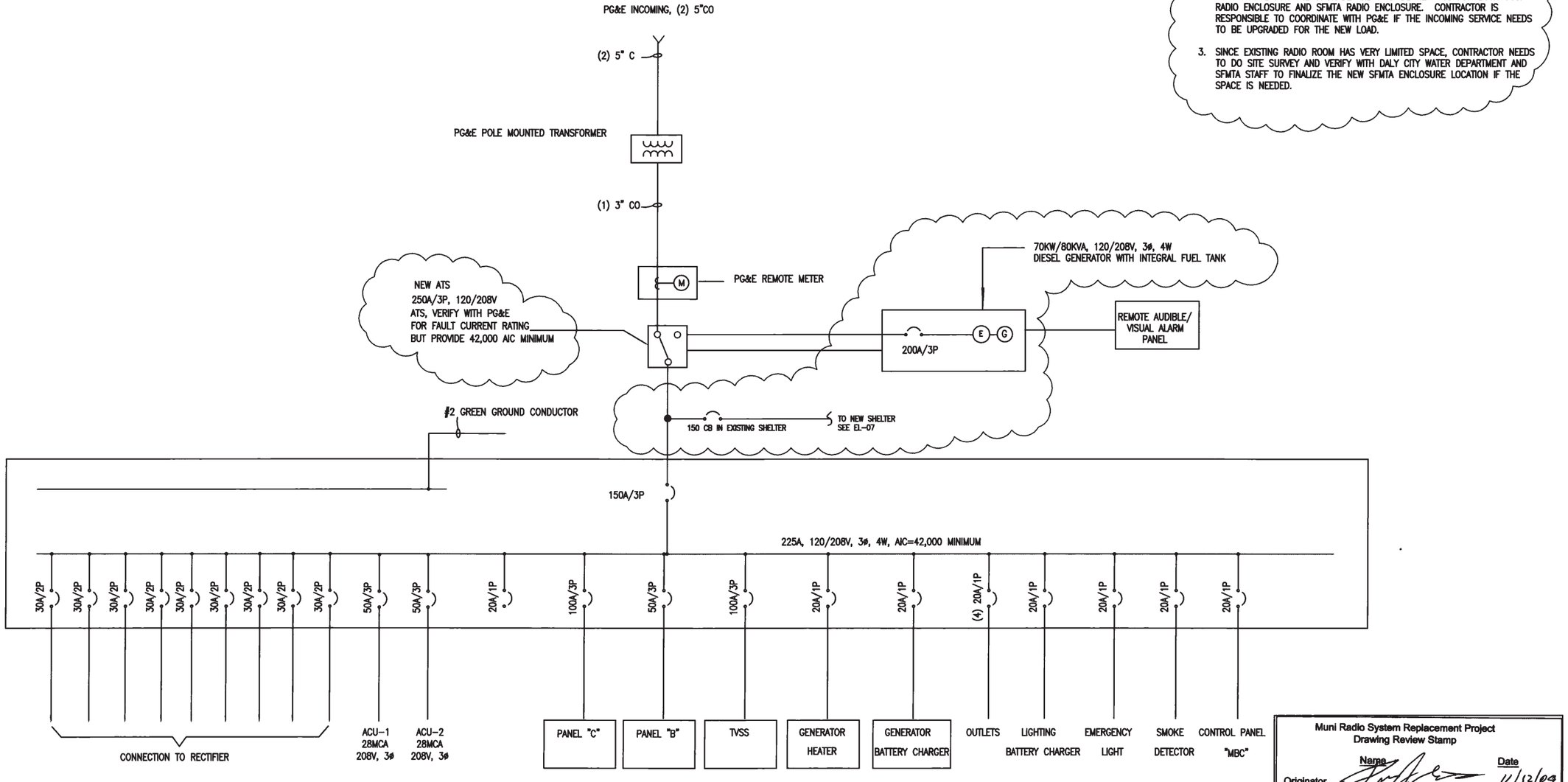
1240

DWG. NO. G-08 | REVISION REV. 0

SHEET NO. 65

NOTES:

1. ALL EQUIPMENT SHOWN IS EXISTING UNLESS OTHERWISE NOTED AS NEW.
2. THE PURPOSE FOR THIS DRAWING IS TO STATE THE CURRENT POWER DISTRIBUTION AT SOUTH HILL CCSF RADIO SITE. CURRENT SOUTH HILL CCSF RADIO SITE HAS CERS AND PERS RADIO SYSTEM. IF THE GENERATOR NEEDS TO BE UPGRADED ACCORDING TO THE NEW LOAD, CONTRACTOR IS REPSONSIBLE FOR THE UPGRADE AND PROVIDE NEW ATS FOR BOTH CCSF RADIO ENCLOSURE AND SFMTA RADIO ENCLOSURE. CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH PG&E IF THE INCOMING SERVICE NEEDS TO BE UPGRADED FOR THE NEW LOAD.
3. SINCE EXISTING RADIO ROOM HAS VERY LIMITED SPACE, CONTRACTOR NEEDS TO DO SITE SURVEY AND VERIFY WITH DALY CITY WATER DEPARTMENT AND SFMTA STAFF TO FINALIZE THE NEW SFMTA ENCLOSURE LOCATION IF THE SPACE IS NEEDED.



Muni Radio System Replacement Project
Drawing Review Stamp

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Back Checker	Thomas Dec. Mgr	11/12/09
Verifier		

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REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is correct and accurate and based on best available information at a 30% completed Radio Replacement Infrastructure design.

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CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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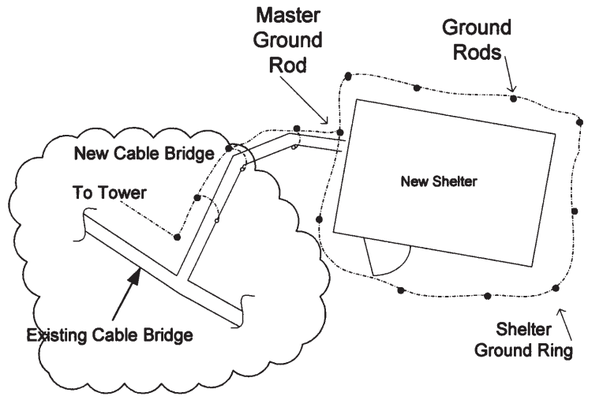
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

1240

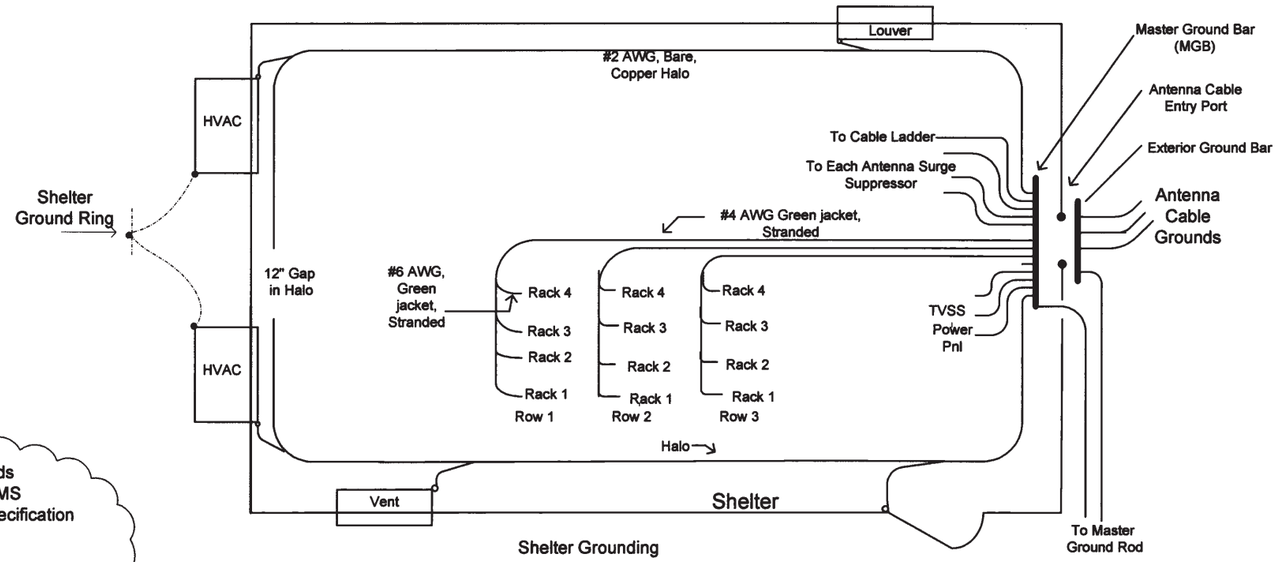
SOUTH HILL
ELECTRICAL EXISTING CONDITIONS

DWG. NO. EL-17
REVISION REV. 0
SHEET NO. 71

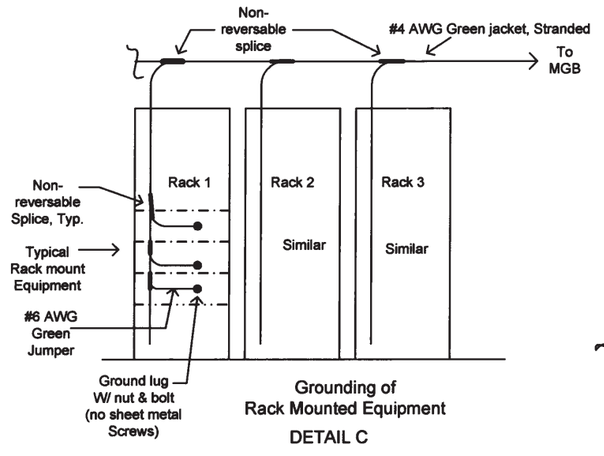


Site Exterior Grounding
DETAIL A

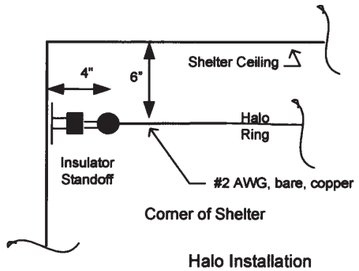
Note:
Minimum of 13 Rods
Maximum of 5 OHMS
See Grounding Specification



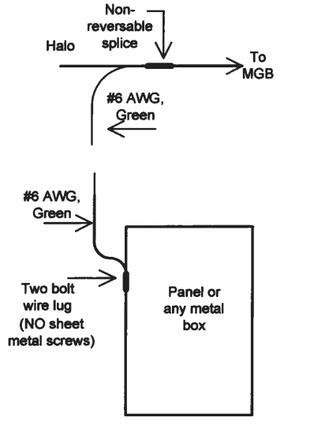
Shelter Grounding
DETAIL B



Grounding of
Rack Mounted Equipment
DETAIL C

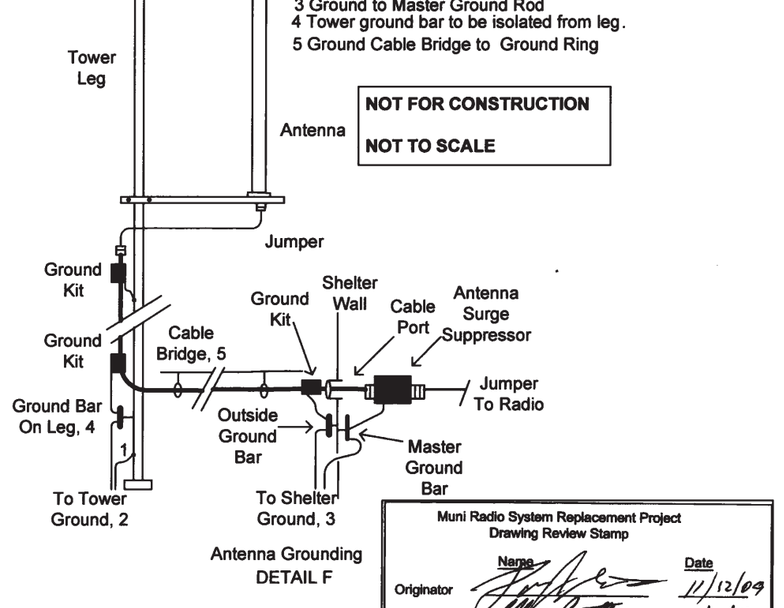


Halo Installation
DETAIL D



Electrical Box Grounding

DETAIL E



Antenna Grounding
DETAIL F

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Acting Dep. Mgr	11/12/09
Verifier		

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REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is current and does not reflect most available information at a 30% completed Radio Replacement Infrastructure design.

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CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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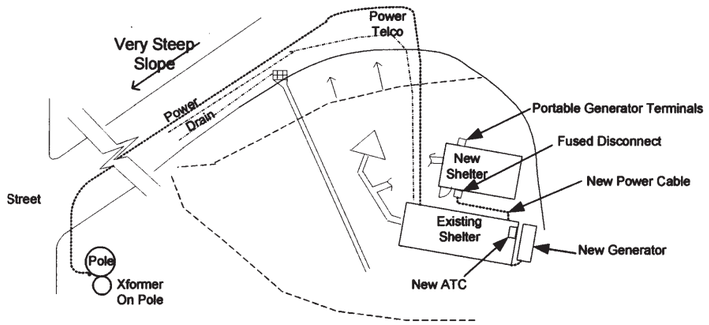
RADIO SYSTEM REPLACEMENT PROJECT

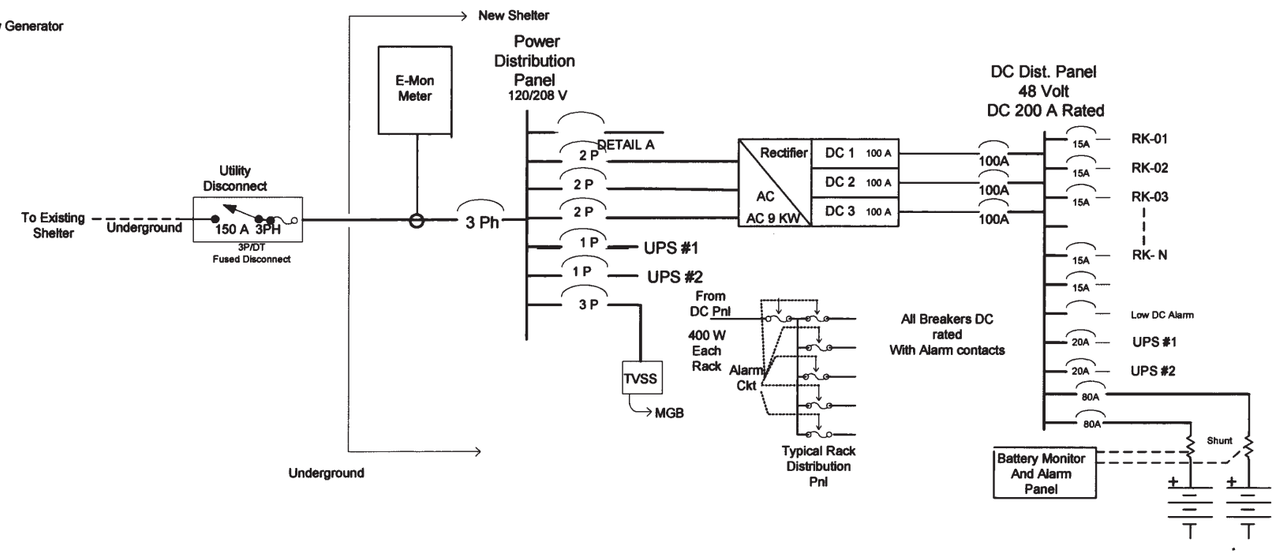
SOUTH HILL
SITE GROUNDING

DWG. NO.	REVISION
EL-08	REV. 0
SHEET NO.	
69	



Partial Site Plan

DETAIL A



Single-Line Diagram

DETAIL B

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
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Back Checker	Thomas Dao, Mgr	11/12/09
Verifier		

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REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
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RADIO SYSTEM REPLACEMENT PROJECT

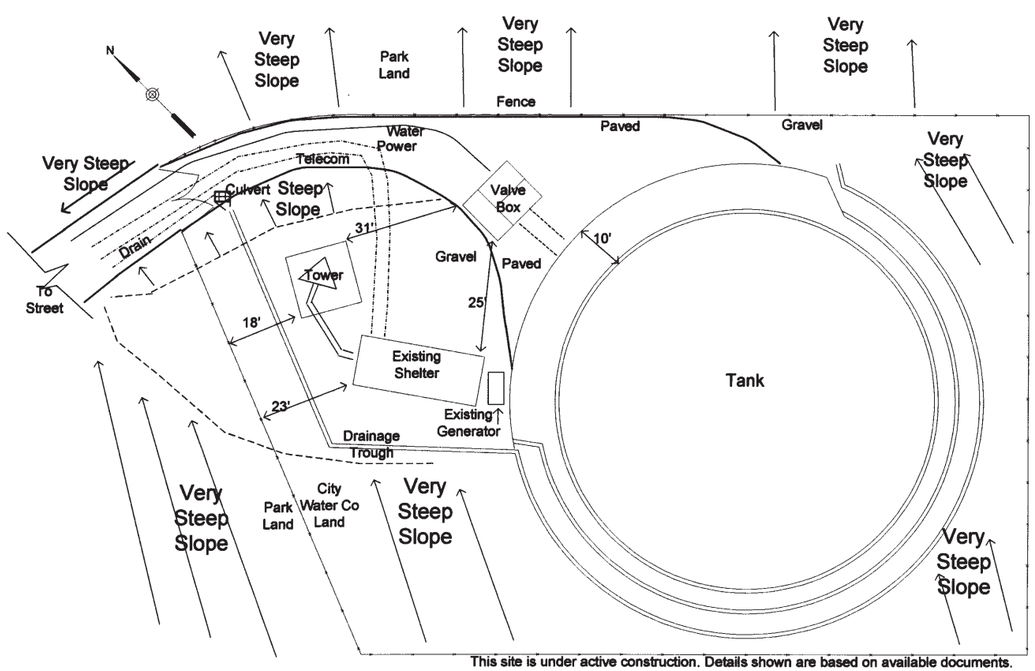
SOUTH HILL
SITE ELECTRICAL

1240

DWG. NO. EL-07

REVISION REV. 0

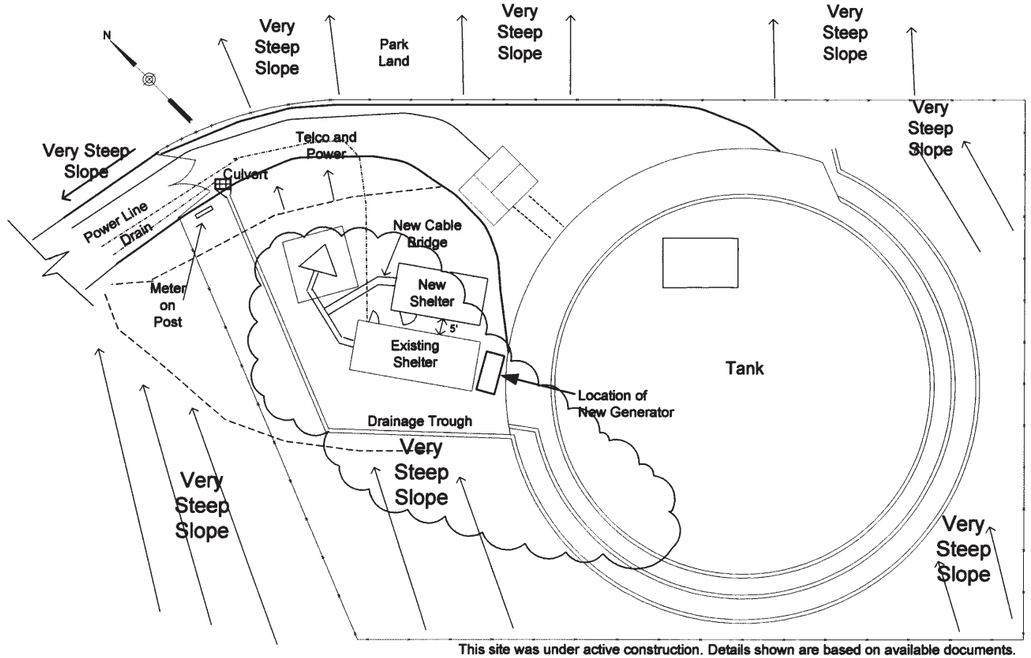
SHEET NO. 68



This site is under active construction. Details shown are based on available documents.

Existing Conditions

DETAIL A



This site was under active construction. Details shown are based on available documents.

Plan with new shelter

DETAIL B

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Acting Dep. Mgr	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith, PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is created and distributed and signed on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

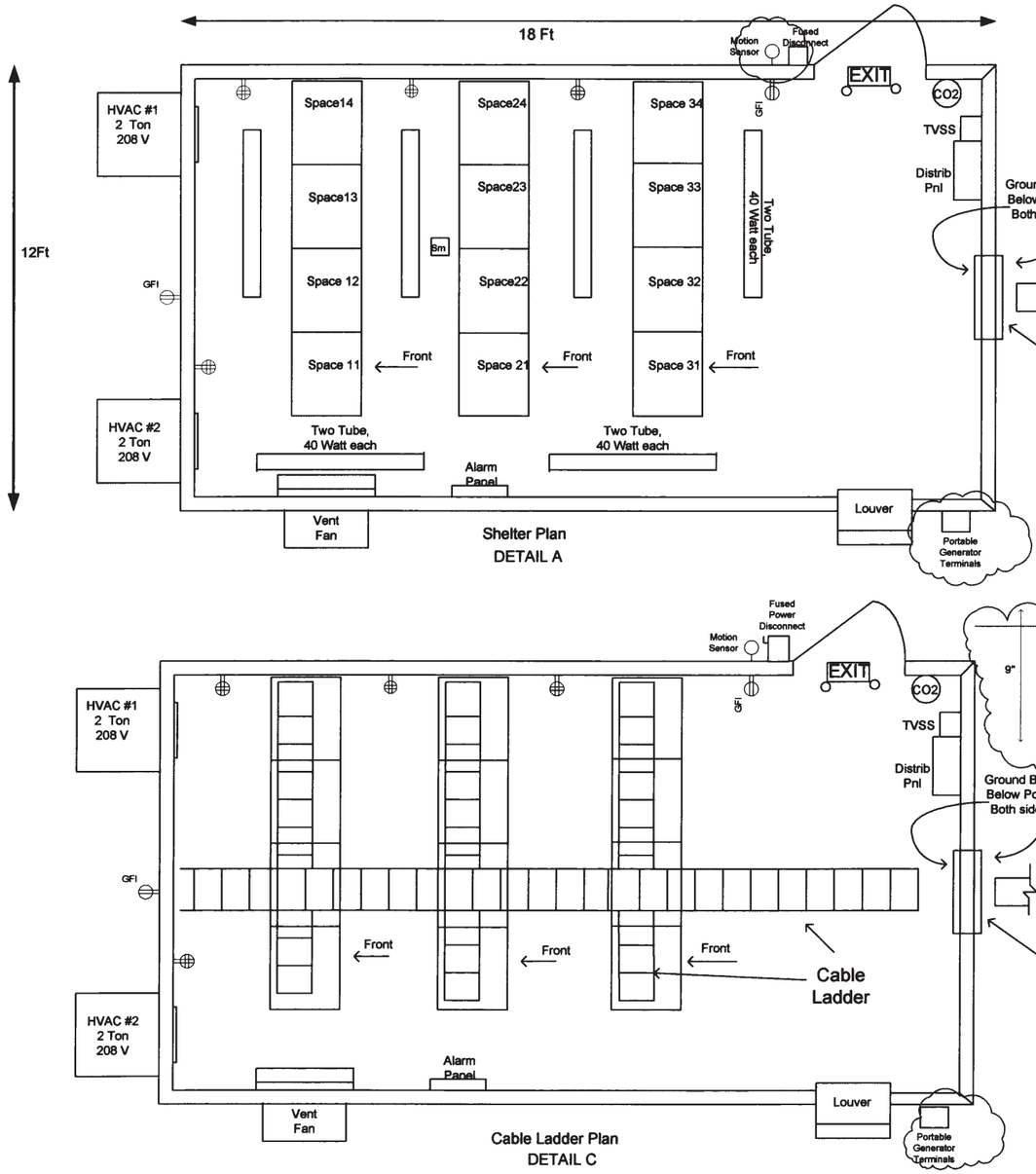
for the EXECUTIVE DIRECTOR / CED

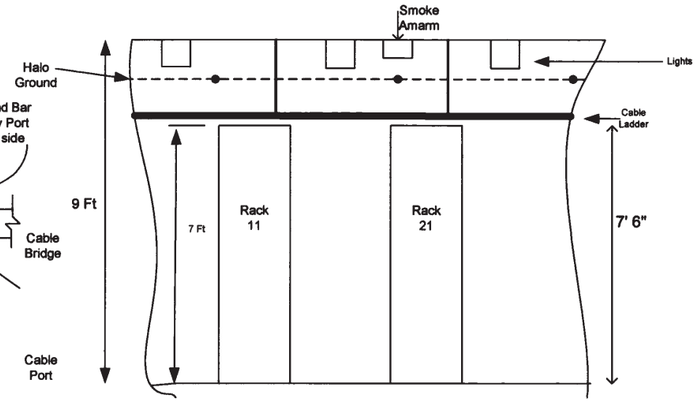
1240

RADIO SYSTEM REPLACEMENT PROJECT

SOUTH HILL
SITE PLAN

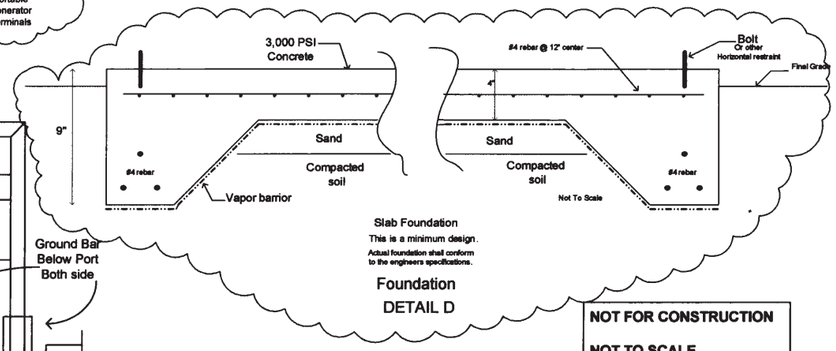
DWG. NO. CV-01
REVISION REV. 0
SHEET NO. 66





Shelter Elevation
DETAIL B

Cable Ladder Plan
DETAIL C



Foundation
DETAIL D

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RC
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
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DESIGNED	FJS
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REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

SOUTH HILL
SHELTER PLAN

(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

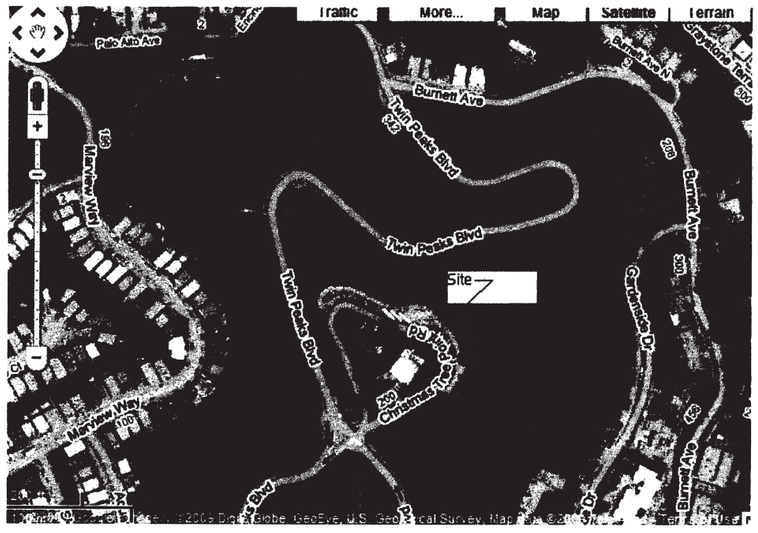
DWG NO. AR-11

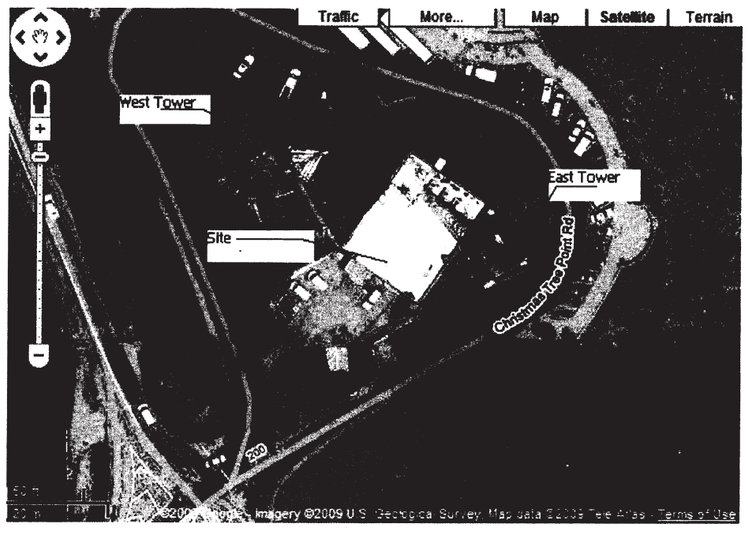
REVISION REV. 0

SHEET NO. 67

GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
3. The "35% Design", as presented, does not include the consequences of further and necessary design work that may include: subsoil investigation, structural analysis, tower structural analysis, seismic considerations, thermal management calculations, electrical load calculations, etc.
4. See "SCOPE OF WORK" on this sheet for further information.
5. The Contractor shall not start construction prior to receiving final, written approval on the resulting design.
6. The information contained in these drawings is accompanied by and supported by the Radio Replacement Project, 35% Design Specification Appendix 12, Section 5.
7. The information in these drawings is schematic in nature. It is intended to convey an outline of a desired result. The information and dimensions shall not be taken as absolute.
8. The Contractor shall be responsible for making it's own observations and measurements.
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.





SITE DESCRIPTION

This hill top site is located south east of the Golden Gate Park and is a popular tourist stop for viewing the SF skyline. Within the site fencing is a large communications building and two antenna towers. The communications building is well reinforced and mostly below grade. The building has existing electrical power, HVAC, grounding and other utilities. The work will be to adapt an available 20 by 30 foot floor space for use as a radio site. The work will include connection of the new equipment to the existing AC power panel. Installation of ground cables and connection to the building ground system. Installation of cable ladders to serve the new radio equipment and to support antenna cables. Provide for connection of copper and fiber communications lines. Mounting the new antennas on the tower and providing for antenna cable routing into the building and to the new radio equipment.

SCOPE OF WORK

35% Design Specification Appendix 12, Section 5.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dec. Mgr	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A.	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith PE # E14042
DISTRICT OF PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is correct and accurate and based on best available information at a 35% completion Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

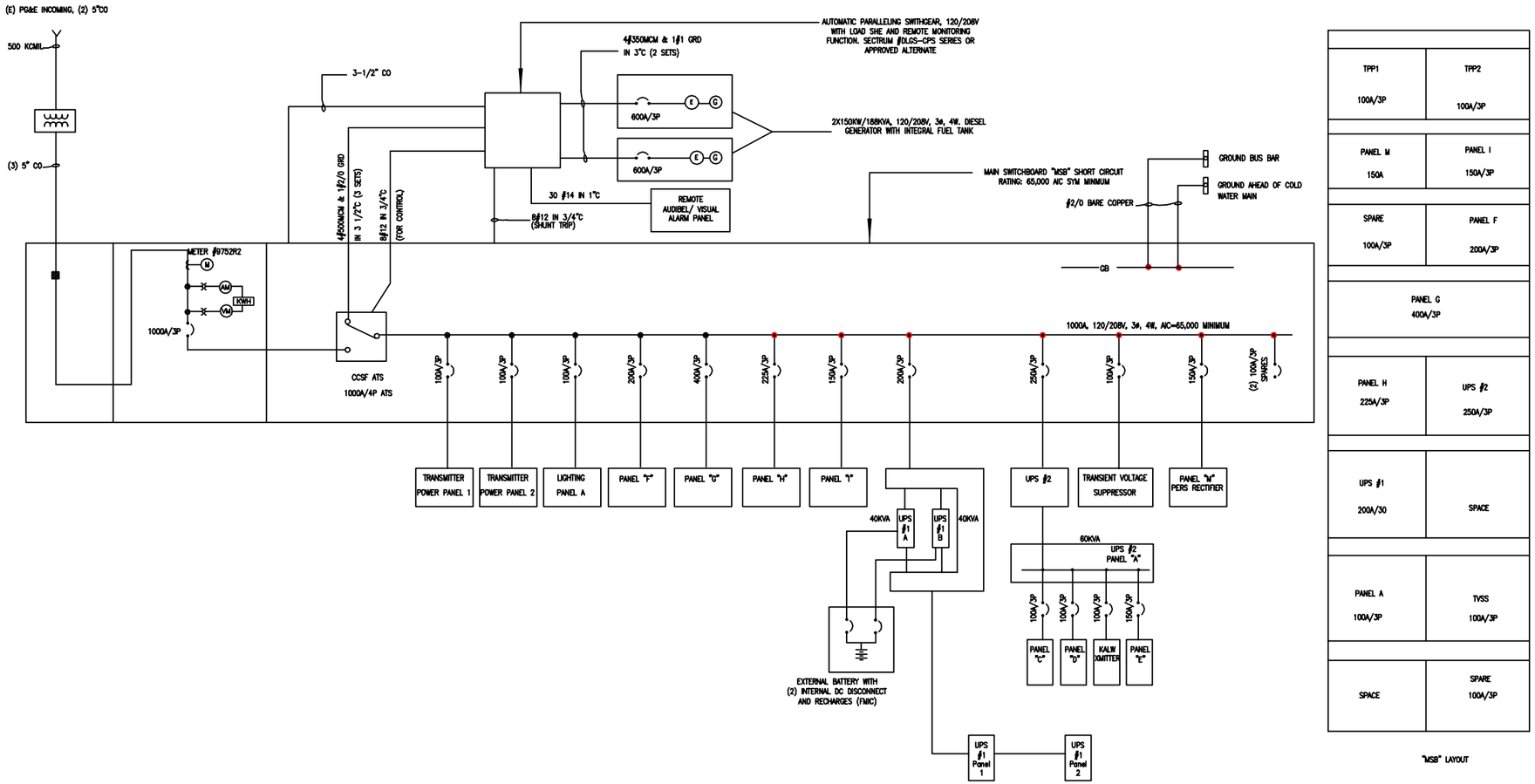
RADIO SYSTEM REPLACEMENT PROJECT

TWIN PEAKS
COVER SHEET

1240

DWG. NO. G-09 | REVISION REV. 0

SHEET NO. 72



NOTES:

1. ALL EQUIPMENT SHOWN IS EXISTING UNLESS OTHERWISED NOTED AS NEW.
2. THE PURPOSE FOR THIS DRAWING IS TO STATE THE CURRENT POWER DISTRIBUTION SYSTEM AS WELL AS THE EXISTING SPARE AND SPACE AT THE MAIN SWITCHBOARD.
3. CONTRACTOR HAS TO VERIFY THE EXISTING CONDITION, DESIGN AND PROVIDE SEPERATE ELECTRICAL PANELS AND WIRING TO MEET NEW RADIO LOAD REQUIRMENT, THE NEW PANEL WILL BE FED BY MAIN SWITCH BOARD.
4. UPS #1 HAS TWO 40KVA UPS. NORMAL WORKING CONDITION IS EACH UPS CARRIES HALF OF THE LOAD (ABOUT 15% LOAD CAPACITY). WHEN ONE FAILURE, THE OTHER ONE WILL CARRY THE FULL LOAD (ABOUT 30% LOAD CAPACITY).
5. UPS #2 IS 60KVA, AVERAGE CARRIES 23% LOAD CAPACITY.
6. CONTRACTOR HAS TO VERIFY UPS CAPACITY TO MEET THE NEW LOAD IF UNINTERRUPTED POWER IS REQUIRED BY THE NEW SYSTEM. THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL A NEW UPS IF IT'S NEEDED.

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

DESIGNED JF
DRAWN DEL
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 10/01/2009

No. E9168
Exp. 9-30-11

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

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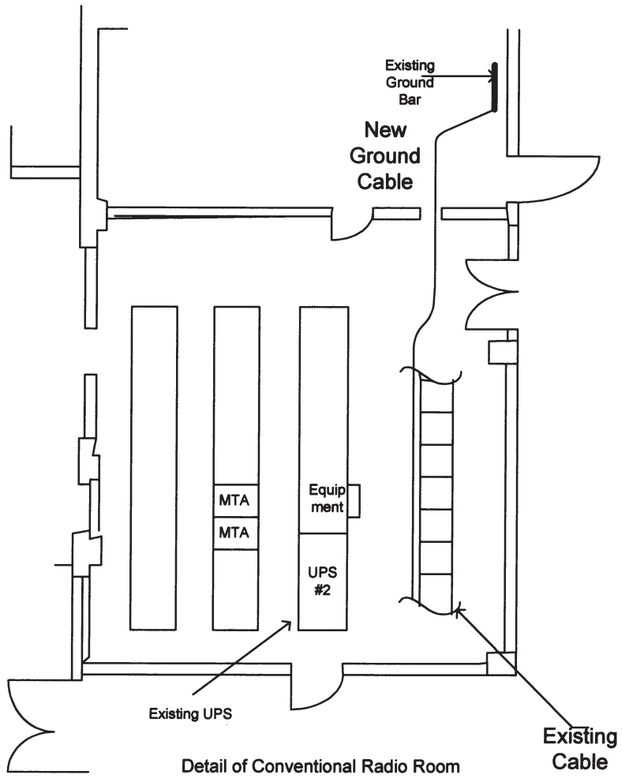
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

TWIN PEAKS
ELECTRICAL EXISTING CONDITIONS

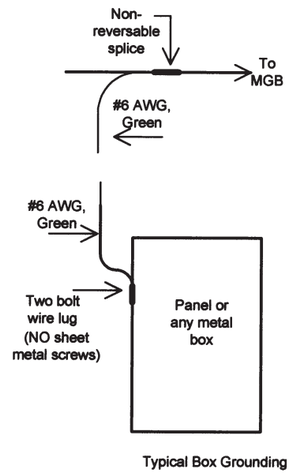
1240

DWG. NO. EL-18
REVISION REV. 0
SHEET NO. 77



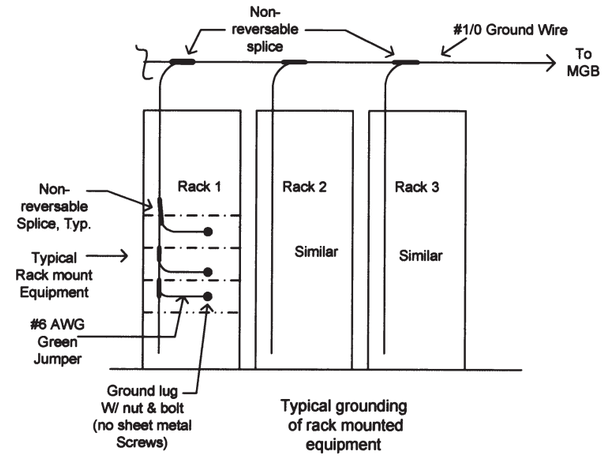
Detail of Conventional Radio Room Existing Equipment

DETAIL A



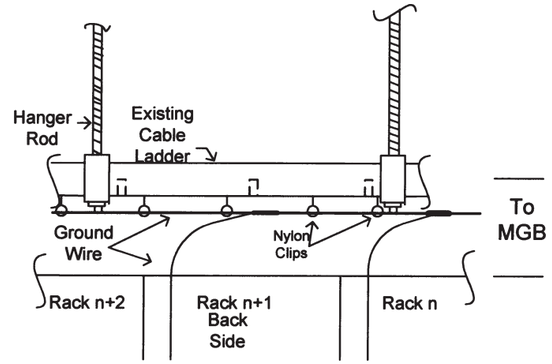
Typical Box Grounding

DETAIL B



Typical grounding of rack mounted equipment

DETAIL C



Elevation of Space Above New Racks

DETAIL D

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Wayne Hayes	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED

REVISIONS

Frank J. Smith PE # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document was originally issued and sealed on last available information as a 30% completed Radio Replacement Infrastructure design

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

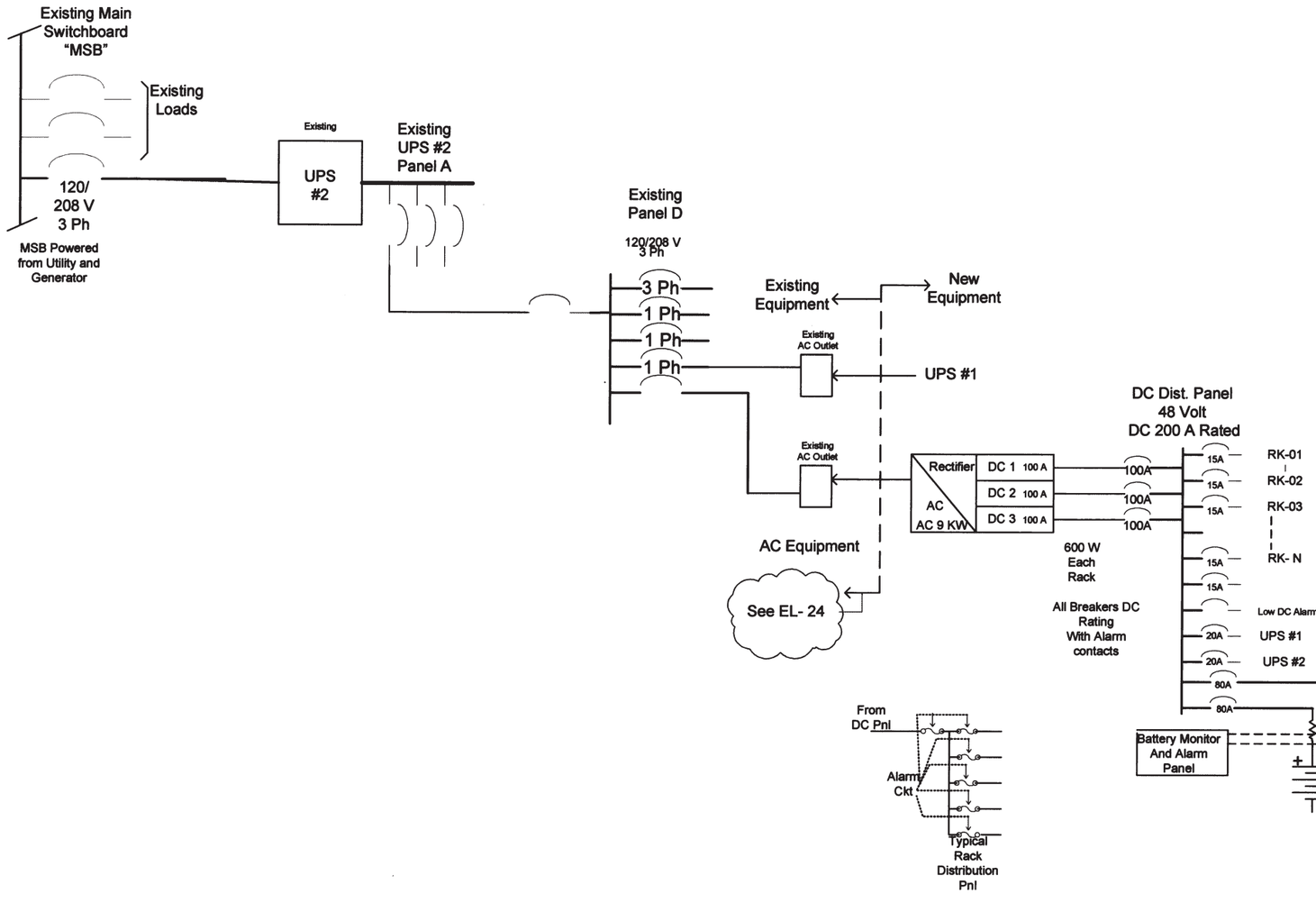
for the EXECUTIVE DIRECTOR / CED

RADIO SYSTEM REPLACEMENT PROJECT

TWIN PEAKS
SITE GROUNDING

1240

DWG. NO. EL-10
SHEET NO. 75
REVISION REV. 0



NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Norma Ibrahim	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042 — REGISTERED PROFESSIONAL ENGINEER — FRANK J. SMITH — E14042 — ELECTRICAL — STATE OF CALIFORNIA — November 24, 2009

DESIGNED	FJS
DRAWN	DEL
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REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

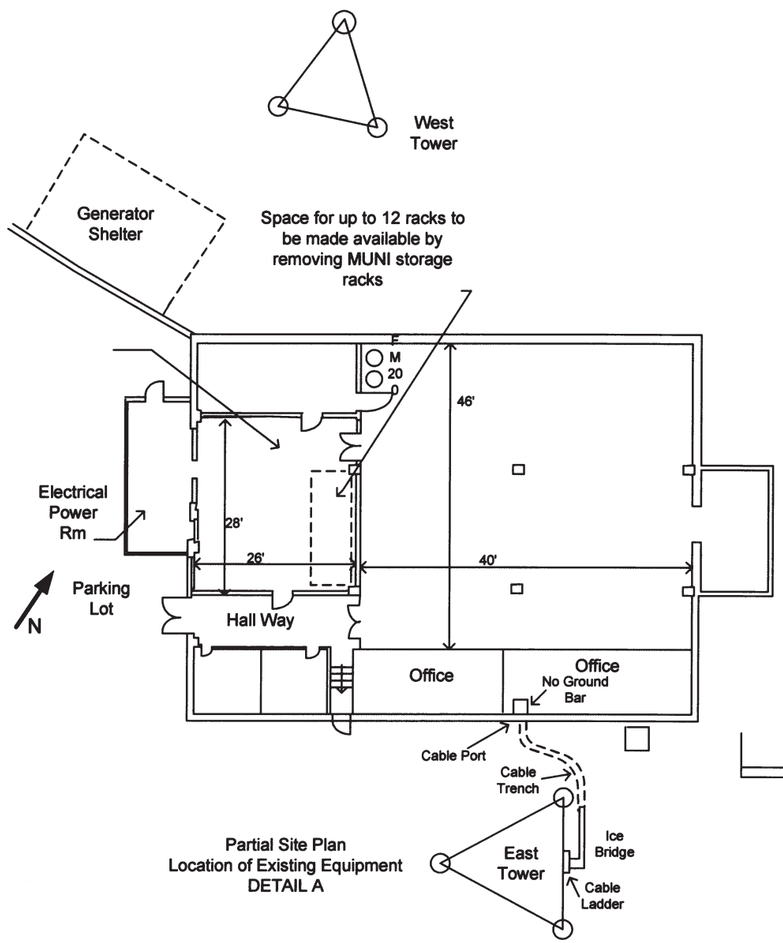
RADIO SYSTEM REPLACEMENT PROJECT

TWIN PEAKS POWER

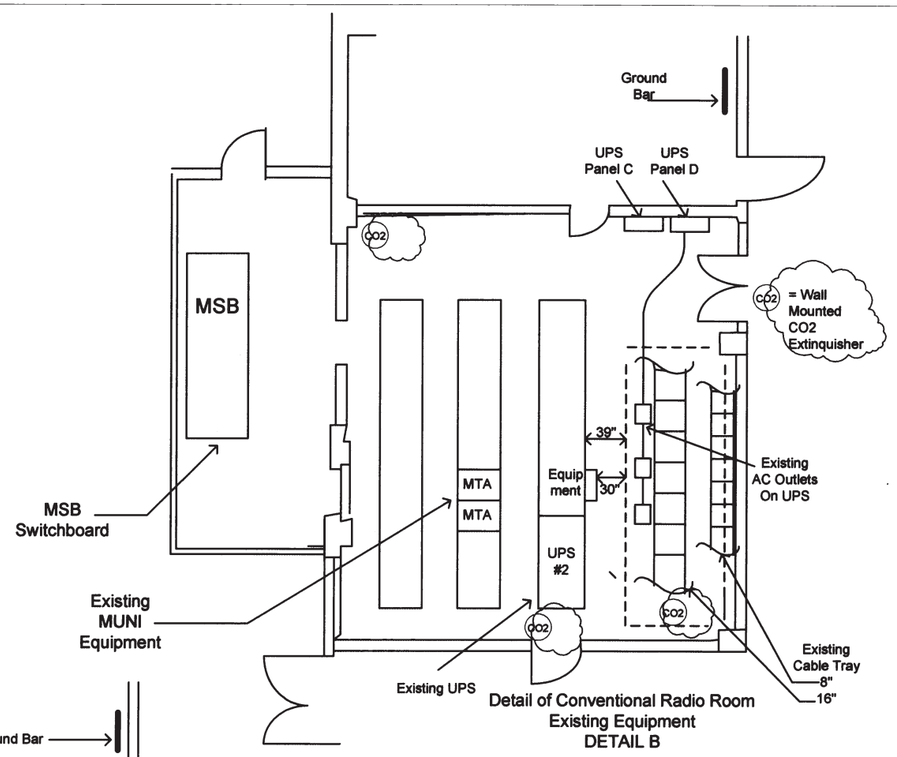
1240

DWG. NO.	REVISION
EL–09	REV. 0

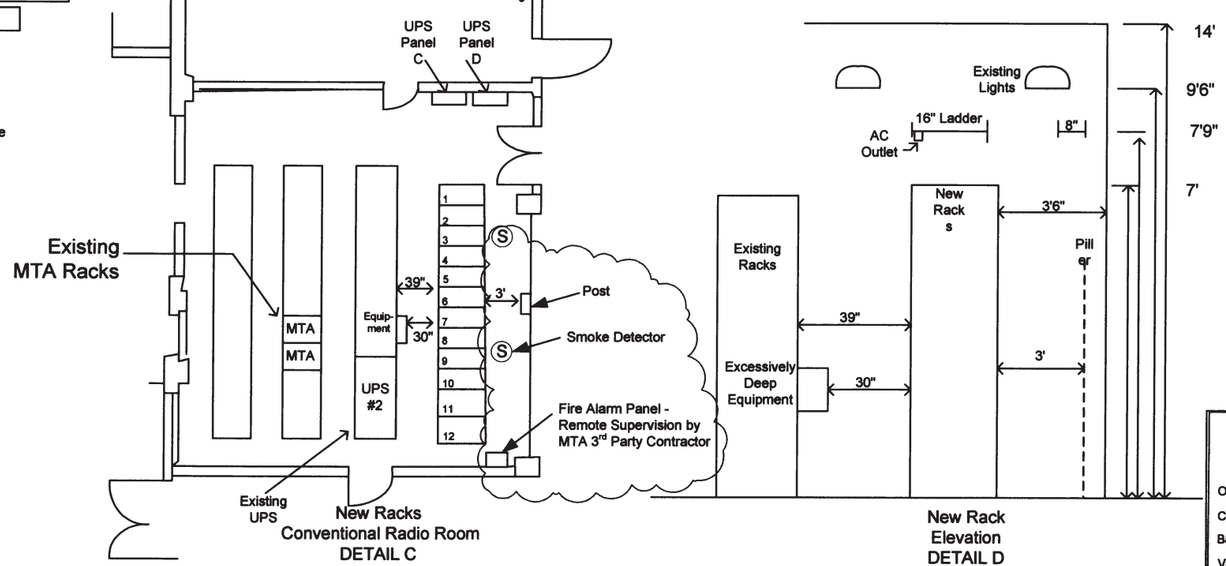
SHEET NO. 74



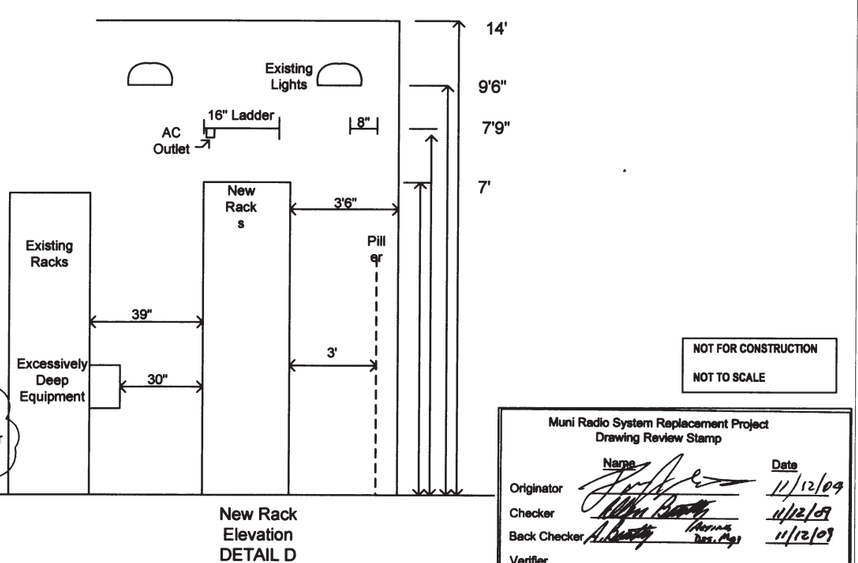
Partial Site Plan
Location of Existing Equipment
DETAIL A



Detail of Conventional Radio Room
Existing Equipment
DETAIL B



New Racks
Conventional Radio Room
DETAIL C



New Rack Elevation
DETAIL D

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Bar. Eng.	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042
PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is current this date and is based on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	08/17/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

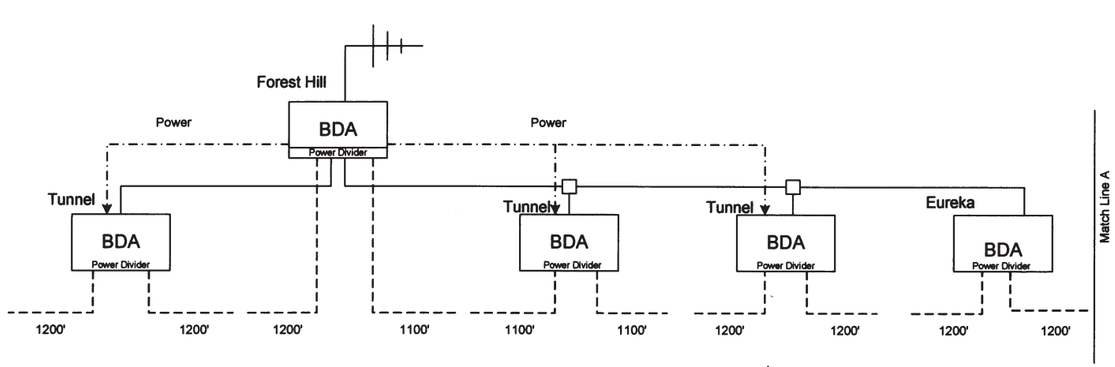
for the EXECUTIVE DIRECTOR / CEO

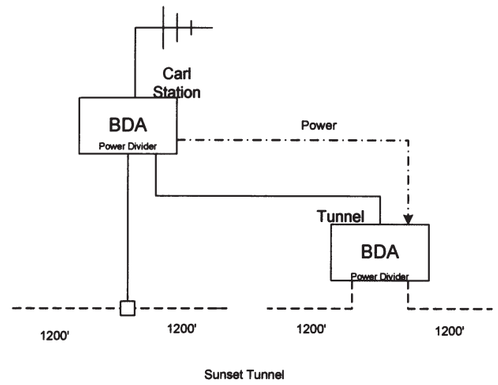
1240

RADIO SYSTEM REPLACEMENT PROJECT

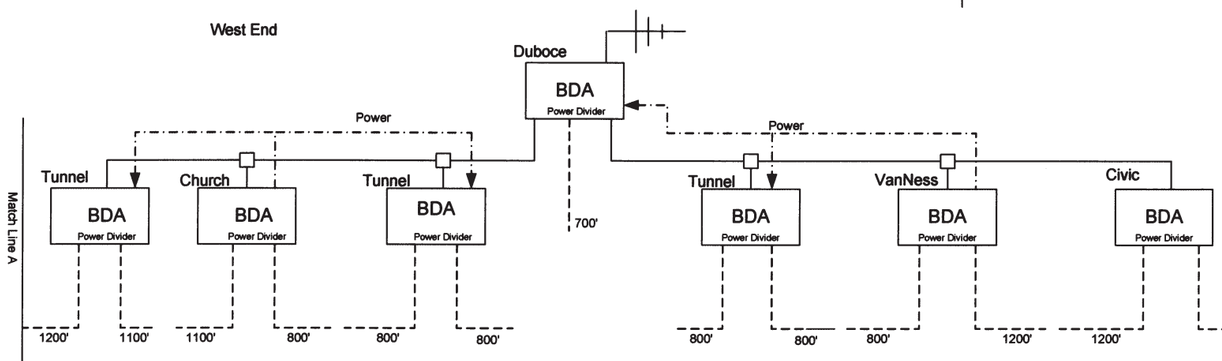
TWIN PEAKS
SITE PLAN

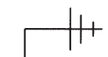
DWG. NO.	REVISION
AR-12	
SHEET NO. 73	REV. 0

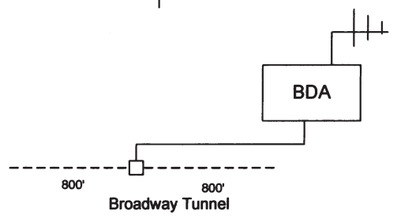




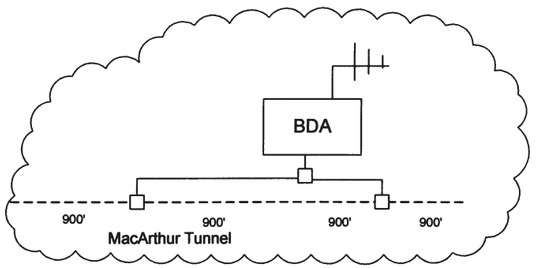
Sunset Tunnel

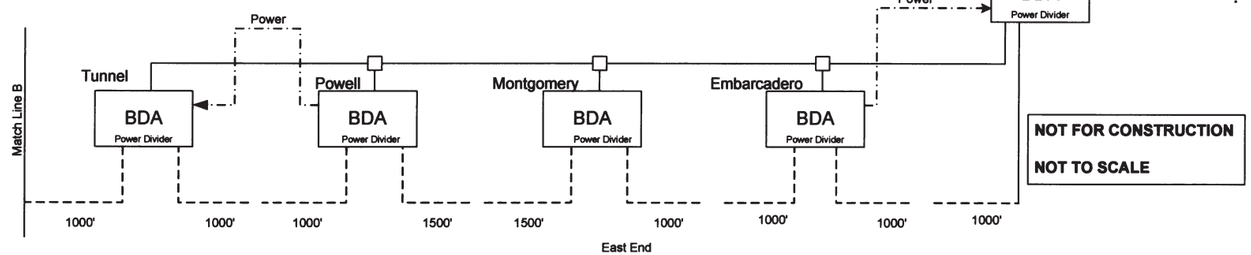






Center Section





East End

Power Divider

Notes

This design is based on the use of 700/800 spectrum only.

The use of a 480 MHz band will require a different equipment configuration. This is a result of limits on the length of the leaky coax at lower frequencies.

This conceptual design does not include consideration of the divided track in Structure Type C, D and E

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dec. Rpt	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042 — REGISTERED PROFESSIONAL ENGINEER — FRANK J. SMITH — E14042 — ELECTRONICS — STATE OF CALIFORNIA — November 24, 2009

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

PLANNED UNDERGROUND EQUIPMENT CONFIGURATION

1240

DWG. NO. SYS-05

REVISION REV. 0

SHEET NO. 80

GENERAL NOTES

1. The design presented on this sheet and the additional referenced sheets and specifications collectively represent a "35% Design". These documents, in their present form, shall not be used to direct construction, consequently they are labeled "NOT FOR CONSTRUCTION".
2. These "35% Design" documents shall provide guidance to the Design-Build Contractor who will take the design to completion prior to its construction. The Documents provide a description of current conditions at the site. They describe the desired configuration of the final design. They provide a feasible but not necessarily economical plan for achieving the final design.
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4. See "SCOPE OF WORK" on this sheet for further information.
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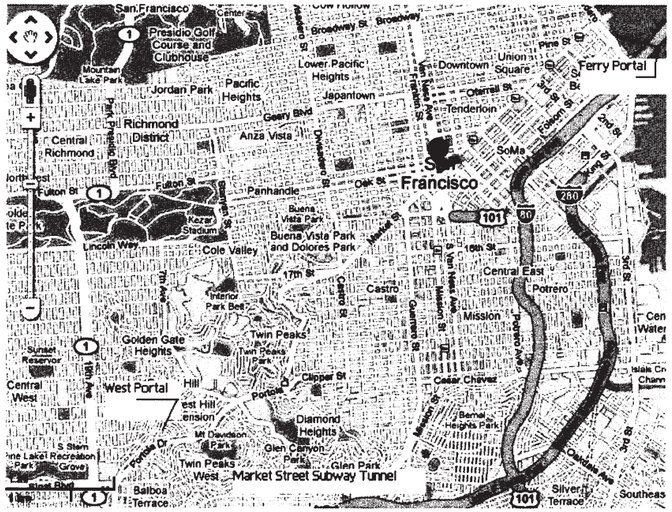
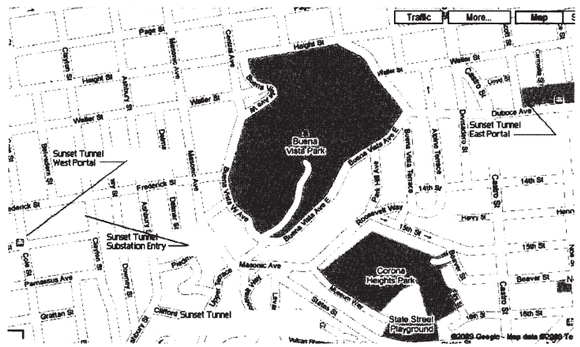
9. The Contractor shall construct the work based on the drawings created by the Contractor and approved by the owner.
10. The Contractor shall be responsible for the production of Final Drawings and Specifications that have been signed and sealed by a Registered Professional Engineer registered in California. All structural calculations shall be signed and sealed by a Registered Professional Structural Engineer registered in California.
11. All designs shall be in compliance with all local building codes and with all requirements of the authority having jurisdiction.
12. The Contractor shall be responsible for submitting all final designs to the local jurisdiction having building code review authority. The Contractor shall be responsible for obtaining all necessary building construction and use permits.
13. The Contractor shall provide materials and documents necessary to obtain the approval of site owners and governing bodies having supervision of the sites.
14. Working in the tunnels or on the tracks shall only be done by personnel that have received appropriate safety training. The Contractor shall be responsible for providing the necessary training to their employees.
15. Work in the tunnels and on the tracks shall only be done at times approved in advance by the MTA. Work in the tunnels shall only be done in the presence of MTA supervision. The Contractor shall provide for the needed supervision.
16. Work in the tunnels and on the tracks shall be limited to non-revenue hours. See Specification for details of restricted work hours.
17. Contractor shall not store construction materials in the tunnels, stations or tracks.

SCOPE OF WORK

35% Specification Appendix 12, Section 5.



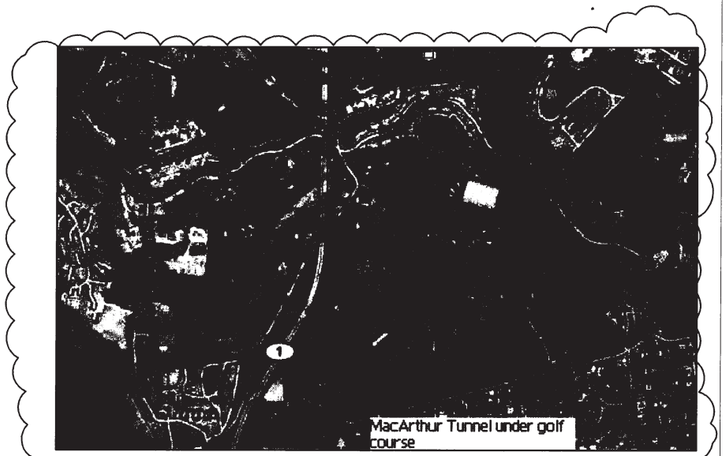


SITE DESCRIPTION

This work is to be done in three tunnels in San Francisco. The tunnels are: the subway tunnel running from Ferry Terminal at Embarcadero Ave to the West Portal at Lenox Way; the subway tunnel called Sunset Tunnel, the vehicle tunnel called the Broadway Tunnel, and the MacArthur Vehicle Tunnel at the Presidio. Equipment will be mounted in each of the stations, along the tracks in the tunnels and at the tunnel portals. Access to work in the tunnels is limited for safety reasons. Access to the work sites is limited vehicles suitable for track work. The work is to install a radio system that will provide reliable communications throughout all of the tunnels. The design can be expected to require installation work in nearly the entire length of the tunnels. The main tunnel is approximately 31,000 feet long with much of the length consisting of two parallel tubes. The Sunset Tunnel is a single tube approximately 4,300 feet long. The Broadway Tunnel is a twin tune approximately 2,000 feet long. The MacArthur Tunnel is a single tube, 4,300 feet long.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
Verifier		



NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith RE. # E14042
REGISTERED PROFESSIONAL ENGINEER
FRANK A. SMITH
E14042
ELECTRONICAL
STATE OF CALIFORNIA
November 24, 2009
This document is issued and sealed on hard or digital information at a 35% completed Radio Replacement Network design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

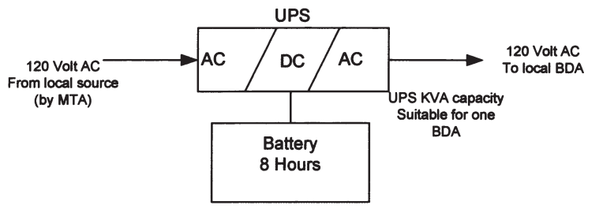
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

PLANNED UNDERGROUND
COVER SHEET
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

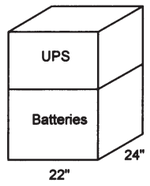
1240

DWG. NO.	REVISION
G-10	REV. 0
SHEET NO. 78	



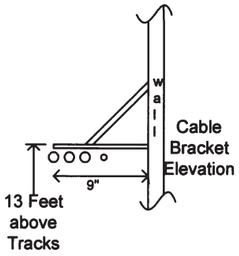
Note This Detail:
Configuration typical of sites supporting one BDA such as:
Civic Center, Eureka and Montgomery.

DETAIL A

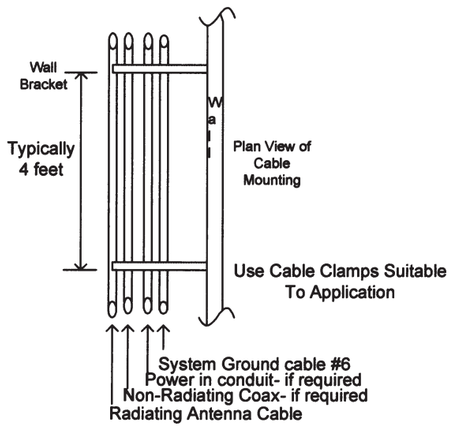


Power Cabinet
(Single Load)
DETAIL B

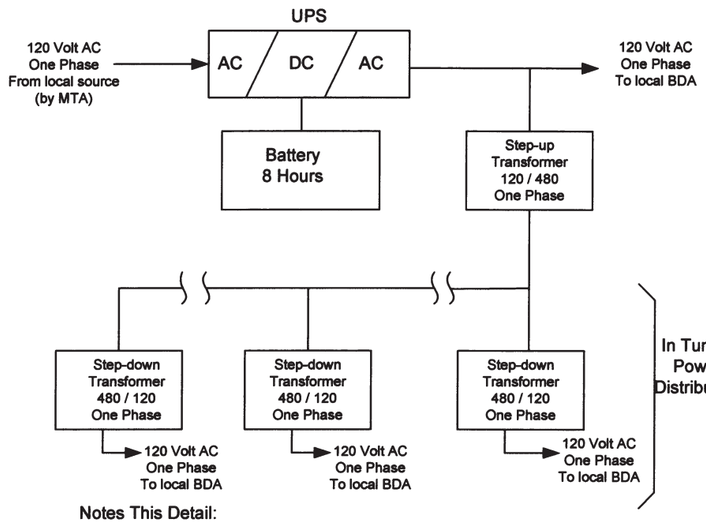
See Note 1



Cable Tray in Tunnel Elevation
DETAIL E



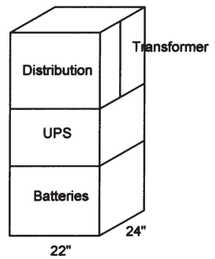
Cable Tray in Tunnel Plan
DETAIL F



Notes This Detail:

1. Configuration typical of sites supporting multiple BDA such as: Forest Hill, VanNess, Church and Powell.
2. Detail design and protective fusing shall comply with latest applicable NEC and all local codes.
3. All equipment in the tunnel shall be NEMA 4 and rigid conduit.
4. Sites such as Powell, Embarcadero and Carl require only one set of transformers.
5. The UPS and transformers shall be sized to suite the number of BDAs supported.

DETAIL C



Power Cabinet
(Multiple Load)
DETAIL D

See Note 1

NOTES:

1. NEMA 1, Locking Cabinet Design

NOT FOR CONSTRUCTION
NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Dos. Mgt	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith, No. E14042 — Registered Professional Engineer — Electrical — State of California — November 24, 2009

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

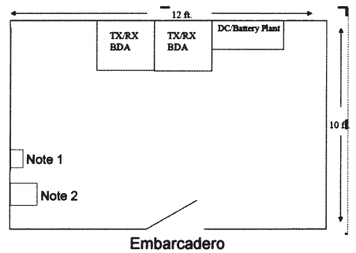
UNDERGROUND
POWER DETAILS

1240

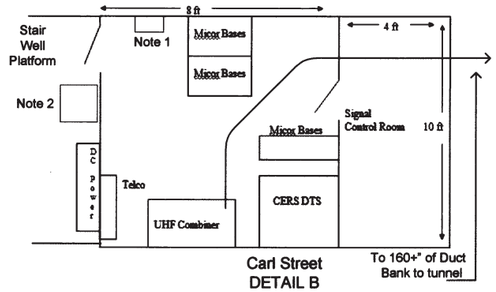
DWG. NO. EL-11

REVISION REV. 0

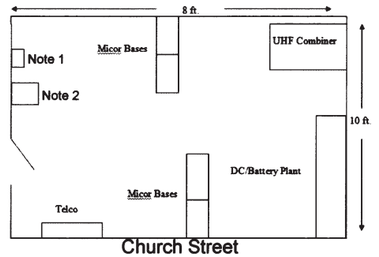
SHEET NO. 83



Embarcadero
DETAIL A



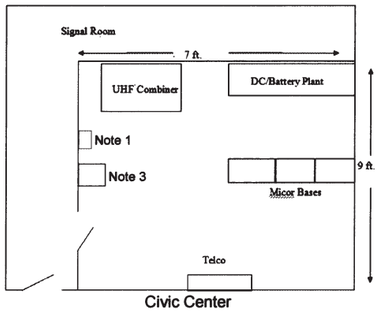
Carl Street
DETAIL B



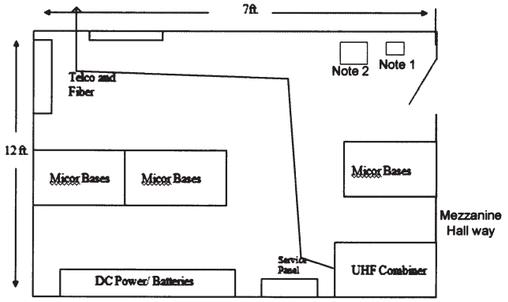
Church Street
DETAIL C

NOT FOR CONSTRUCTION

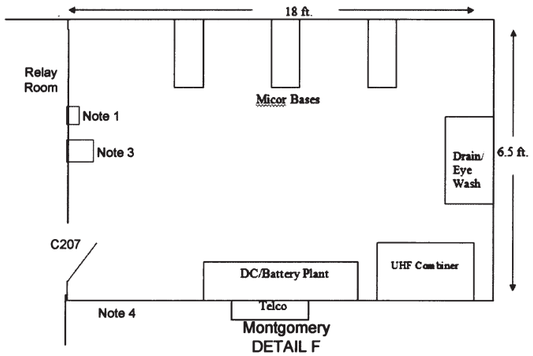
NOT TO SCALE



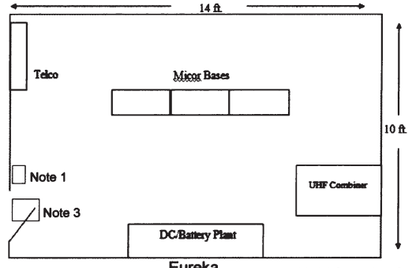
Civic Center
DETAIL D



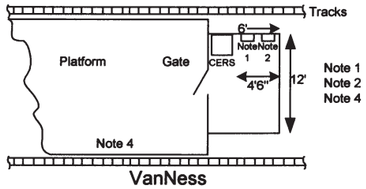
Forest Hills
DETAIL E



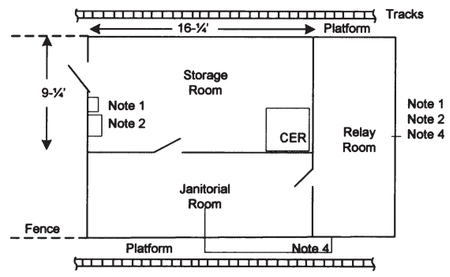
Montgomery
DETAIL F



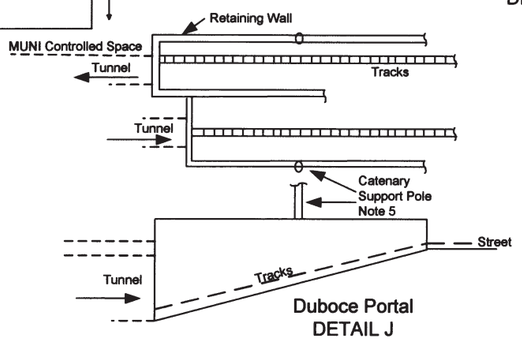
Eureka
DETAIL G



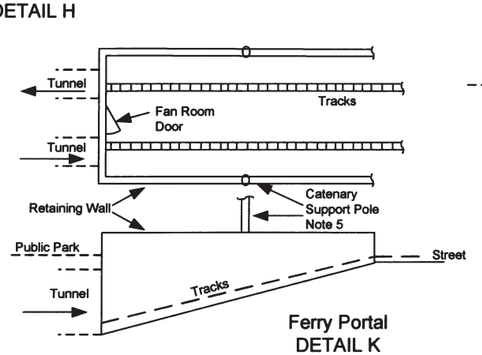
VanNess
DETAIL H



Powell
DETAIL I



Duboce Portal
DETAIL J



Ferry Portal
DETAIL K

Notes:

1. BDA frame see Detail I of "Equip. Mounting Details".
2. Power Cabinet see Detail D of "Power Details".
3. Power Cabinet see Detail B of "Power Details".
4. Platform Level, between tracks, end of platform
5. Mount antenna on catenary support post.

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Rex Pryor	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG

REVISIONS

Frank J. Smith PE # E14042
E14042
Exp. 3/31/2010
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

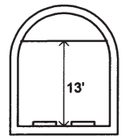
1240

RADIO SYSTEM REPLACEMENT PROJECT

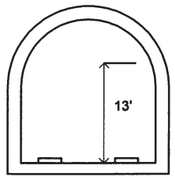
UNDERGROUND
EQUIPMENT LOCATION DETAILS

(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

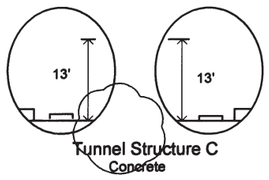
DWG. NO.	REVISION
AR-15	
SHEET NO. 82	REV. 0



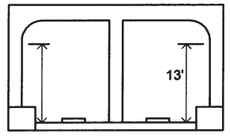
Tunnel Structure A
Concrete
DETAIL A



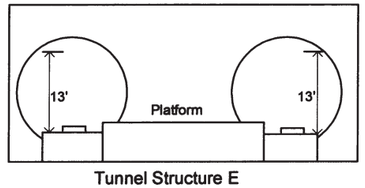
Tunnel Structure B
Concrete
DETAIL B



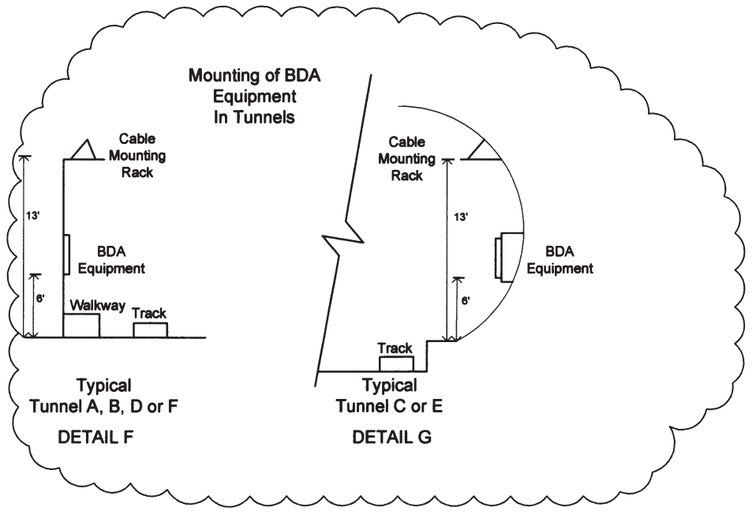
Tunnel Structure C
Concrete
DETAIL C

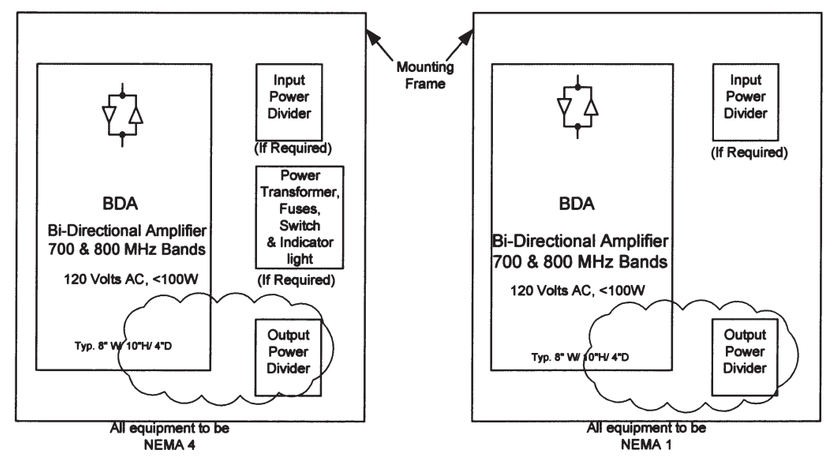


Tunnel Structure D and F
Concrete
DETAIL D



Tunnel Structure E
Steel Tubes
DETAIL E





Typical Tunnel Mounted BDA
DETAIL H

Typical Radio Room Mounted BDA
DETAIL I

NOT FOR CONSTRUCTION

NOT TO SCALE

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker	Thomas Bee, Mgr	11/12/09
Verifier		

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith, PE, #E14042
NATIONAL PROFESSIONAL ENGINEER
FRANK J. SMITH
E14042
ELECTRICAL
STATE OF CALIFORNIA
November 24, 2009
This document is signed and sealed only based on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

PLANNED UNDERGROUND
EQUIPMENT MOUNTING DETAILS
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

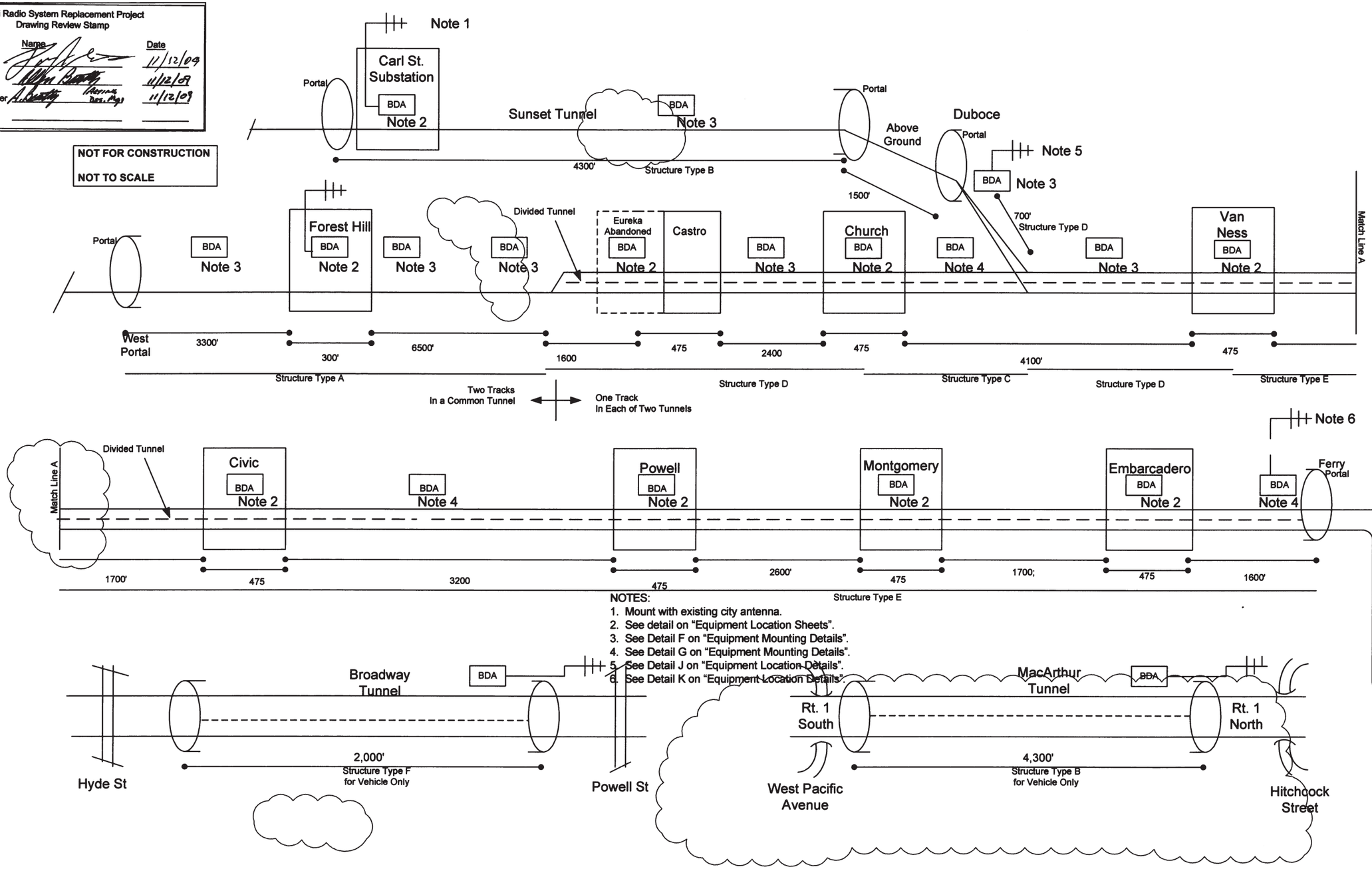
DWG. NO.	REVISION
AR-14	REV. 0
SHEET NO. 81	

Muni Radio System Replacement Project
Drawing Review Stamp

	Name	Date
Originator		11/12/09
Checker		11/12/09
Back Checker		11/12/09
Verifier		

NOT FOR CONSTRUCTION

NOT TO SCALE



NOTES:
1. Mount with existing city antenna.
2. See detail on "Equipment Location Sheets".
3. See Detail F on "Equipment Mounting Details".
4. See Detail G on "Equipment Mounting Details".
5. See Detail J on "Equipment Location Details".
6. See Detail K on "Equipment Location Details".

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	10/23/2009	COMMENTS DURING 10/22/2009 MEETING	FJS	AB	

REVISIONS

Frank J. Smith PE # E14042 — REGISTERED PROFESSIONAL ENGINEER — FRANK J. SMITH — E14042 — Exp. 3/31/2010 — ELECTRICAL — STATE OF CALIFORNIA — November 24, 2009
This document is limited and should be used based on best available information at a 30% completed Radio Replacement Infrastructure design.

DESIGNED	FJS
DRAWN	DEL
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CED

RADIO SYSTEM REPLACEMENT PROJECT

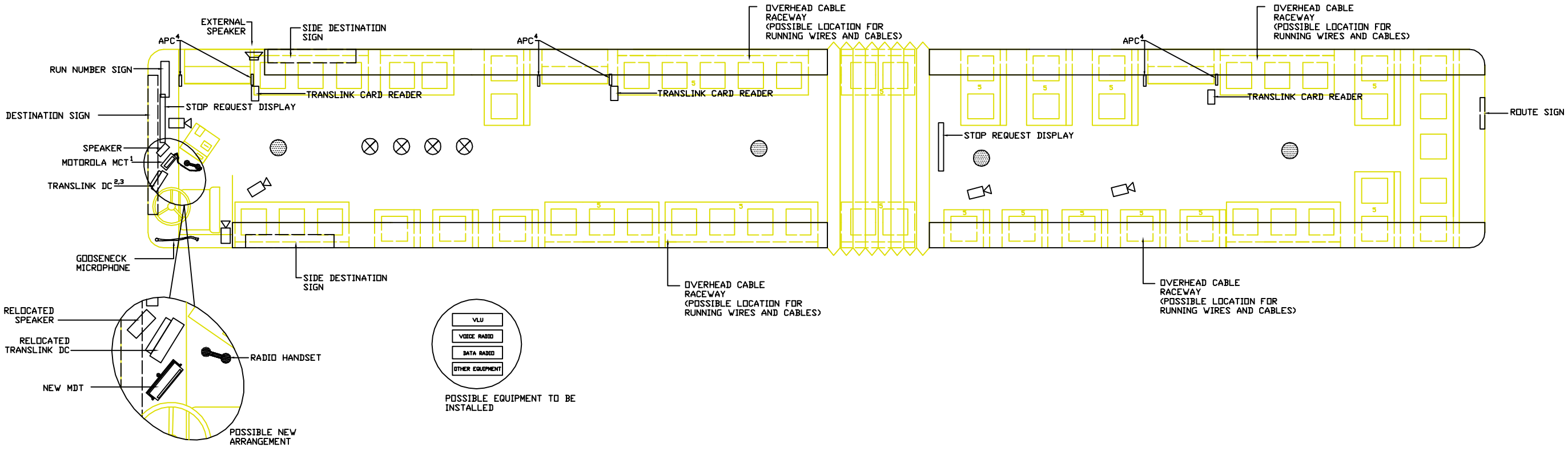
PLANNED UNDERGROUND EQUIPMENT LOCATIONS

1240

DWG. NO. AR-13

REVISION REV. 0

SHEET NO. 79



NOTES:

1. EXISTING RADIO MAY BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. EXISTING TRANSLINK DC IS INSTALLED ABOVE THE DRIVER'S WINDSHIELD
4. APC INSTALLED ONLY ON A PORTION OF THE FLEET
5. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERA (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ DESIGN ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GATE E 17047 EXP. 3/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

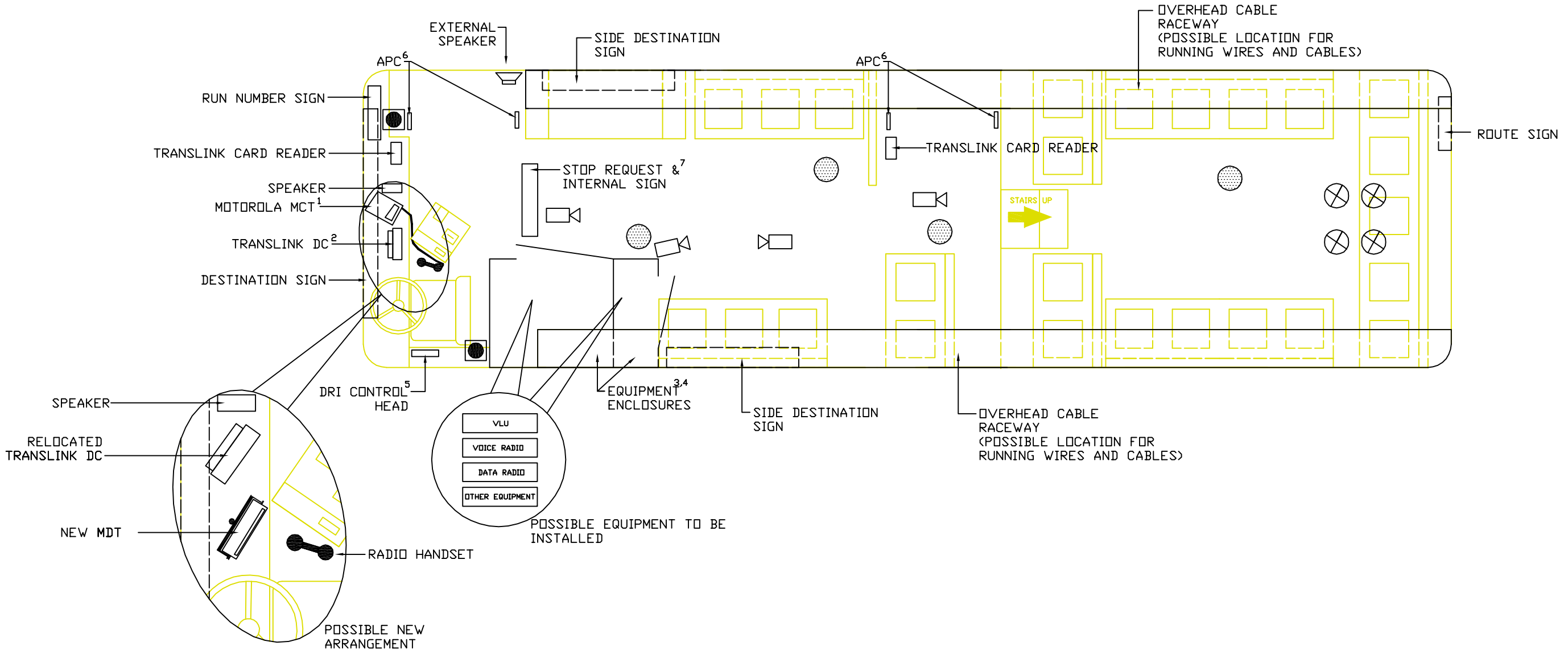
RADIO SYSTEM REPLACEMENT PROJECT

1240

60 FOOT NEW FLYER TROLLEY BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO. ME-23 | REVISION REV. 0

SHEET NO. 12



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. POSSIBLE LOCATIONS FOR NEW EQUIPMENT
4. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
5. EXISTING DRI CONTROL HEAD IS INSTALLED ABOVE DRIVER SIDE WINDOW
6. APC INSTALLED ONLY ON A PORTION OF THE FLEET
7. REUSE INTERNAL SIGN, IF FEASIBLE.
8. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
9. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
10. EXISTING STOP REQUEST & INTERNAL SIGN AND DESTINATION SIGNS MAY REQUIRE RETENTION OF THE DRI CONTROL HEAD FOR J1708 INTERFACE OR ALTERNATIVELY BE REPLACED WITH NEW.
11. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

ROBERT GAFF — REGISTERED PROFESSIONAL ENGINEER — E 17047 — EXP 9/30/11 — ELECTRICAL — STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

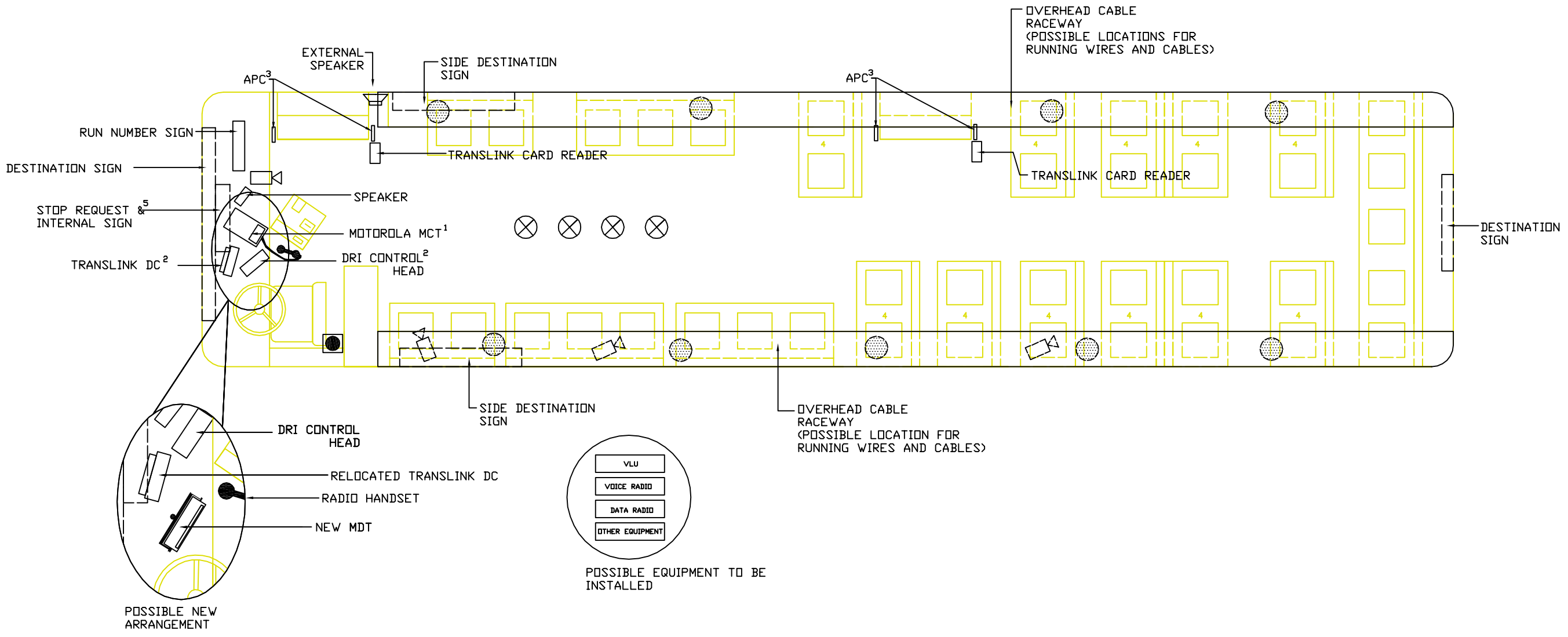
1240

30 FOOT ORION HYBRID BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO. ME-08

REVISION REV. 0

SHEET NO. 11



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC AND DRI CONTROL HEAD MAY REQUIRE RELOCATION
3. APC INSTALLED ONLY ON A PORTION OF THE FLEET
4. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
5. REUSE INTERNAL SIGN, IF FEASIBLE.
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OF COMPLETENESS OF EQUIPMENT. THE CONTRACTOR OF SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. EXISTING STOP REQUEST & INTERNAL SIGN AND DESTINATION SIGNS MAY REQUIRE RETENTION OF THE DRI CONTROL HEAD FOR J1708 INTERFACE OR ALTERNATIVELY BE REPLACED WITH NEW.
8. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAVE E 17047 EXP. 9/30/13 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/09/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

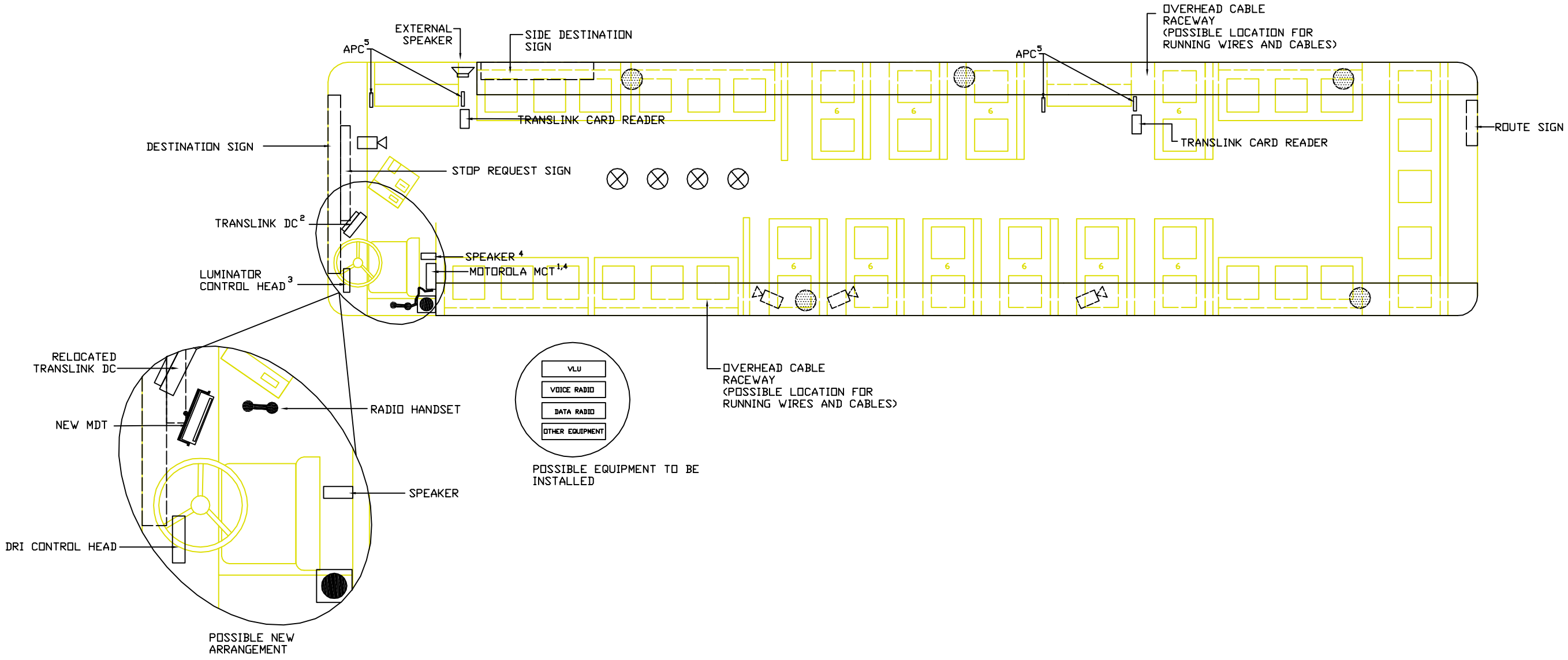
RADIO SYSTEM REPLACEMENT PROJECT

40 FOOT ELECTRIC TROLLEY BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME-07	REV. 0

SHEET NO. 10



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. EXISTING LUMINATOR CONTROL HEAD IS INSTALLED ABOVE THE DRIVER'S WINDSHIELD
4. EXISTING SPEAKER AND MOTOROLA MCT ARE MOUNTED BEHIND THE DRIVER ABOVE THE SEAT
5. APC INSTALLED ONLY ON A PORTION OF THE FLEET
6. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
7. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
8. EXISTING STOP REQUEST & INTERNAL SIGN AND DESTINATION SIGNS MAY REQUIRE RETENTION OF THE DRI CONTROL HEAD FOR J1708 INTERFACE OR ALTERNATIVELY BE REPLACED WITH NEW.
9. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

DESIGNED S. BHANJI
DRAWN J. LIO
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

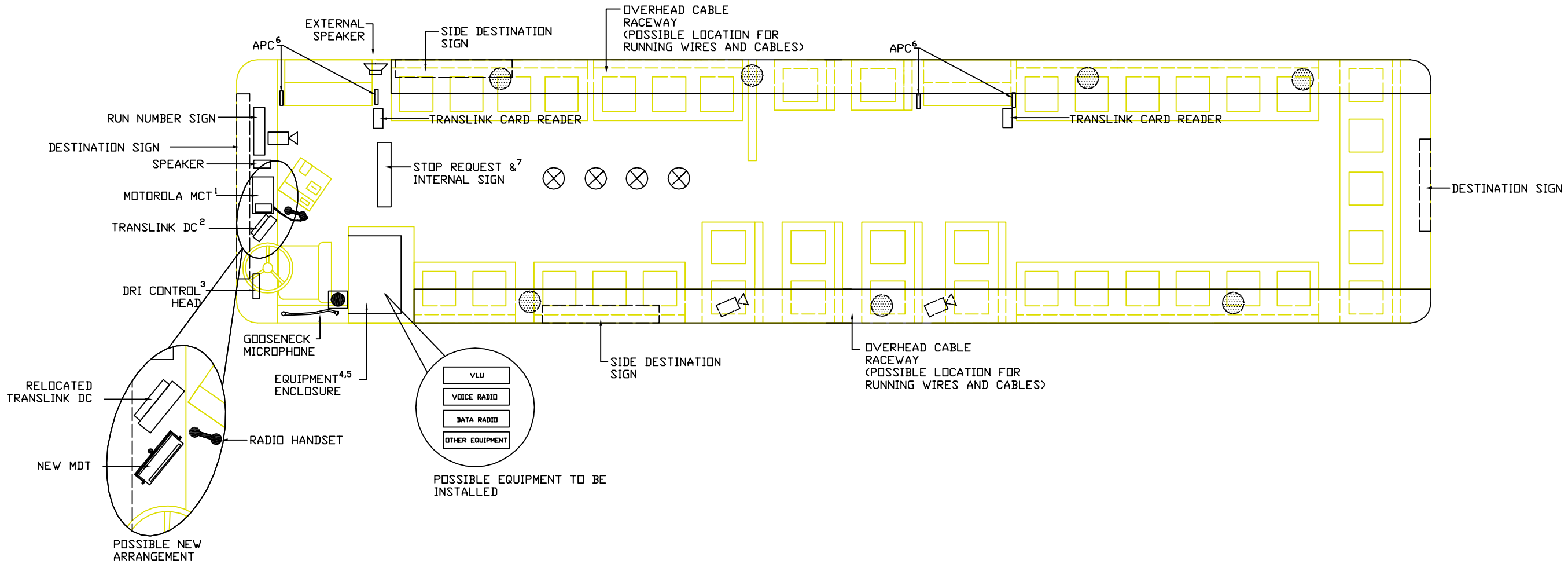
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

40 FOOT GILLIG BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. ME-06
REVISION
SHEET NO. 9
REV. 0



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. EXISTING DRI CONTROL HEAD IS INSTALLED ABOVE THE DRIVER'S WINDSHIELD
4. POSSIBLE LOCATION FOR NEW EQUIPMENT
5. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
6. APC INSTALLED ONLY ON A PORTION OF THE FLEET
7. REUSE INTERNAL SIGN, IF FEASIBLE.
8. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
9. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
10. EXISTING STOP REQUEST & INTERNAL SIGN AND DESTINATION SIGNS MAY REQUIRE RETENTION OF THE DRI CONTROL HEAD FOR J1708 INTERFACE OR ALTERNATIVELY BE REPLACED WITH NEW.
11. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	11/09/2009	FOR RFQ DESIGN ISSUE	SB	JP	RG

REVISIONS

ROBERT GAGE E 17047 EXP 3/30/11 REGISTERED PROFESSIONAL ENGINEER ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/09/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

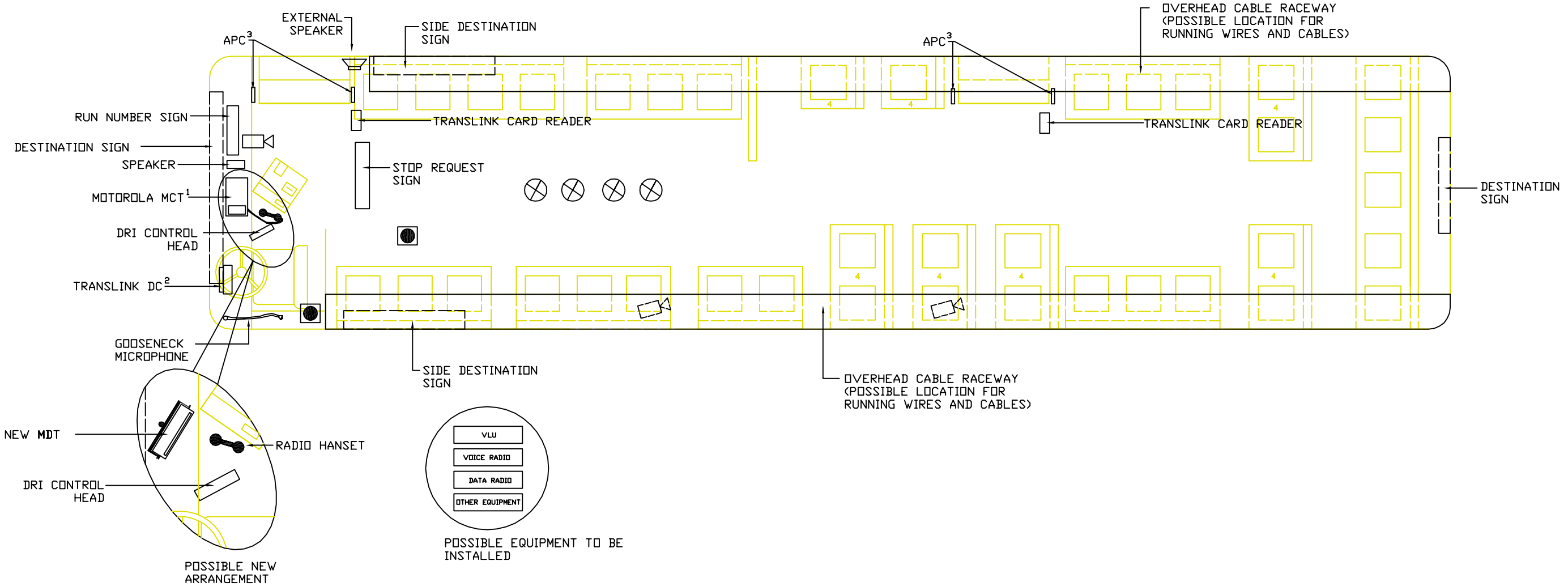
for the EXECUTIVE DIRECTOR / CEO

1240

RADIO SYSTEM REPLACEMENT PROJECT

40 FOOT NABI BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO.	REVISION
ME-05	REV. 0
SHEET NO. 8	



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC IS INSTALLED ABOVE THE DRIVER'S WINDSHIELD
3. APC INSTALLED ONLY ON A PORTION OF THE FLEET
4. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
5. INTERIOR SPEAKERS LOCATED WITHIN OVERHEAD RACEWAY
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. EXISTING STOP REQUEST & INTERNAL SIGN AND DESTINATION SIGNS MAY REQUIRE RETENTION OF THE DRI CONTROL HEAD FOR J1708 INTERFACE OR ALTERNATIVELY BE REPLACED WITH NEW.
8. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

ROBERT GATE — E 17047 — exp 9/30/11 — REGISTERED PROFESSIONAL ENGINEER — ELECTRICAL — STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

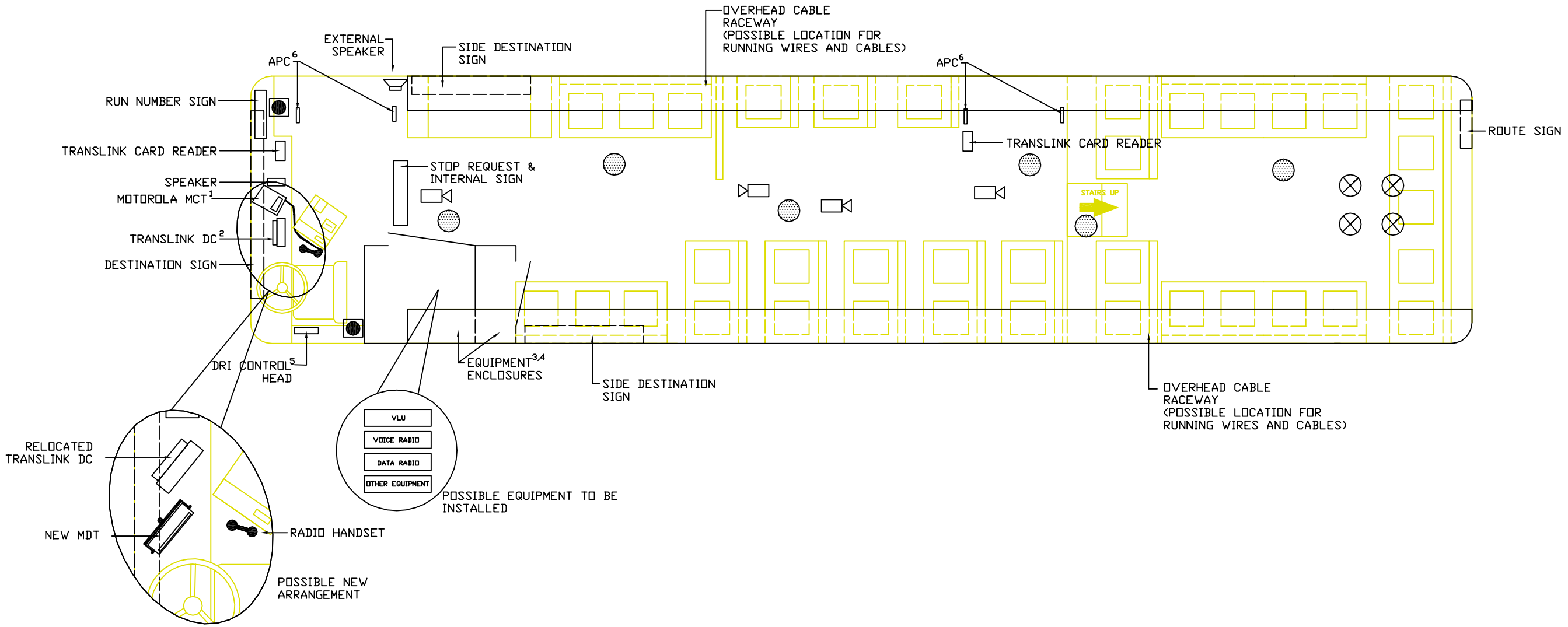
40 FOOT NEOPLAN BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. ME-04

REVISION REV. 0

SHEET NO. 7



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. POSSIBLE LOCATIONS FOR NEW EQUIPMENT
4. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
5. EXISTING DRI CONTROL HEAD IS INSTALLED ABOVE DRIVER SIDE WINDOW
6. APC INSTALLED ONLY ON A PORTION OF THE FLEET
7. POSSIBLE LOCATIONS FOR NEW EQUIPMENT UNDER VARIOUS NON-ADA COMPLIANT SEAT
8. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
9. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
B	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GALE E 17047 EXP 9-30-11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	–
REVIEWED	–
RECOMMENDED	–
APPROVED	–
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

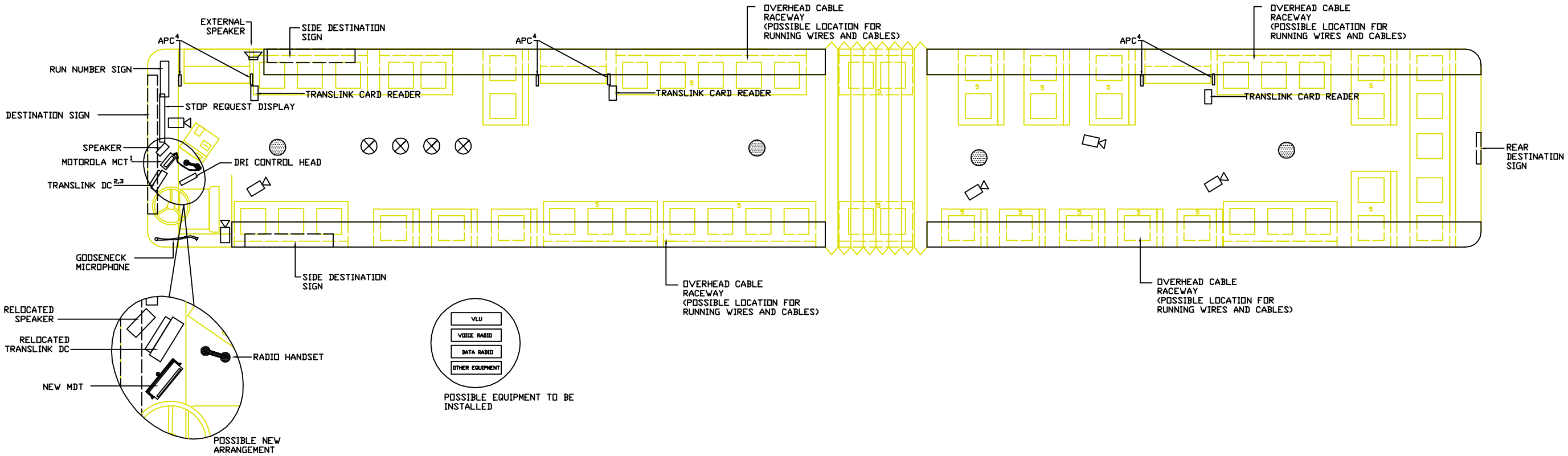
1240

RADIO SYSTEM REPLACEMENT PROJECT

40 FOOT ORION HYBRID BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO. ME–03 | REVISION REV. 0

SHEET NO. 6



LEGEND:

CAMERA (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NOTES:

1. EXISTING RADIO MAY BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. EXISTING TRANSLINK DC IS INSTALLED ABOVE THE DRIVER'S WINDSHIELD
4. APC INSTALLED ONLY ON A PORTION OF THE FLEET
5. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT LAU E 17047 EXP 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

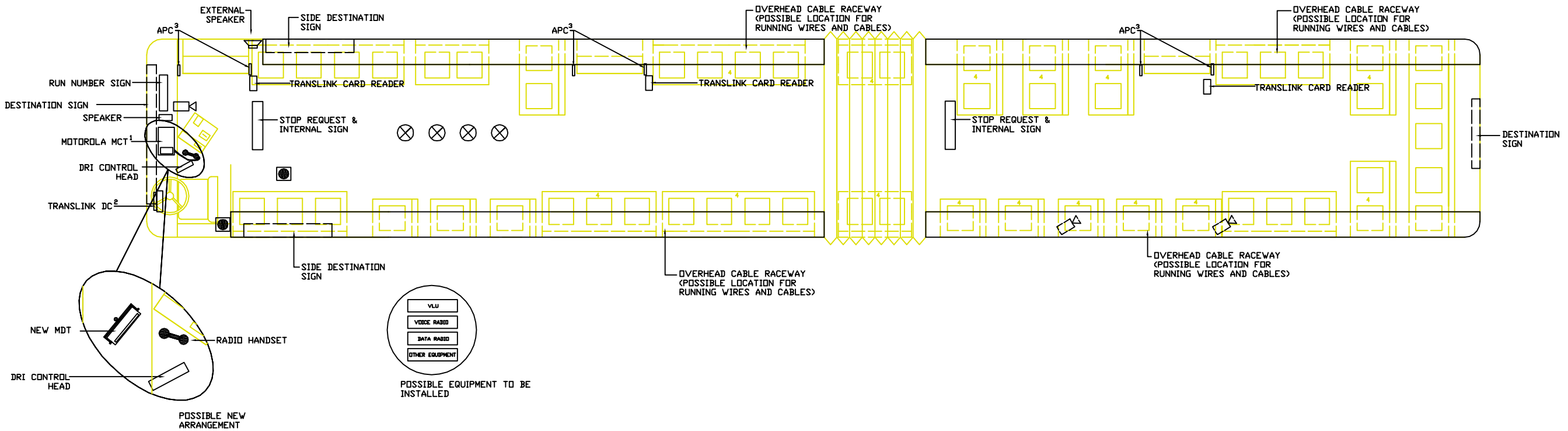
60 FOOT ELECTRIC TROLLEY BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. ME-02

REVISION REV. 0

SHEET NO. 5



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC IS INSTALLED ABOVE THE DRIVER'S WINDSHIELD
3. APC INSTALLED ONLY ON A PORTION OF THE FLEET
4. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
5. INTERIOR SPEAKERS LOCATED WITHIN OVERHEAD RACEWAY
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

CAMERA (TWO DIFFERENT MANUFACTURERS)

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT CLAVE E 17047 Exp. 5/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

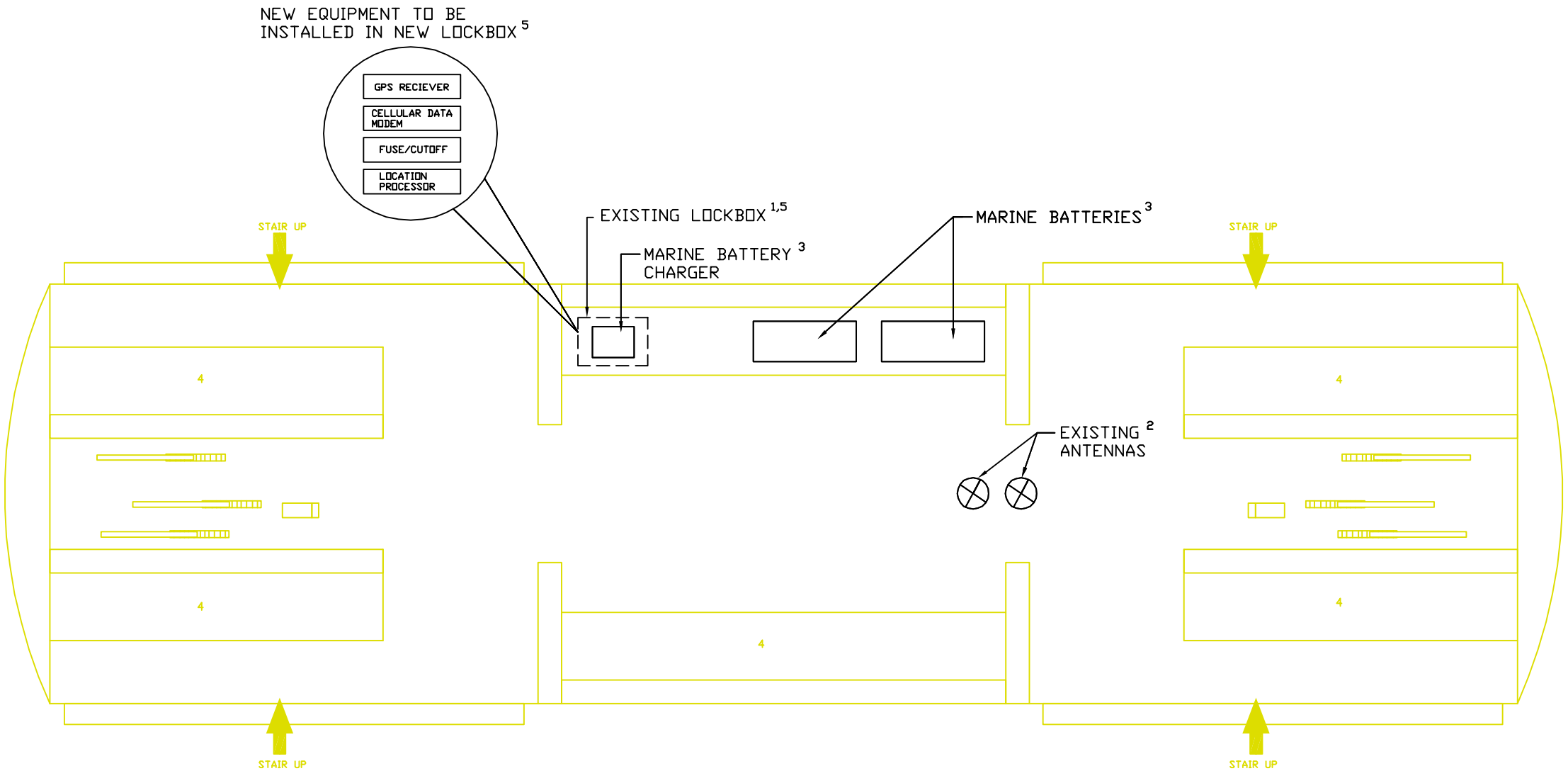
for the EXECUTIVE DIRECTOR / CEO

1240

RADIO SYSTEM REPLACEMENT PROJECT

60 FOOT NEOPLAN ARTICULATION BUS PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO.	REVISION
ME-01	REV. 0
SHEET NO. 4	



NOTES:

1. EXISTING NEXT BUS TRACKER EQUIPMENT LOCATED BELOW CHARGER INSTALLED IN LOCKBOX (APPROX. 8"x12"x4") UNDERNEATH CABLE CAR
2. EXISTING ANTENNA LOCATIONS TO BE DETERMINED
3. EQUIPMENT INSTALLED AND LOCATED UNDER SEATS
4. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
5. EXISTING LOCKBOX TO BE REMOVED AND REPLACED WITH NEW LOCKBOX CONTAINING NEW EQUIPMENT.
6. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
7. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
8. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP REVIEW	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT LIMI E 17047 EXP 5/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

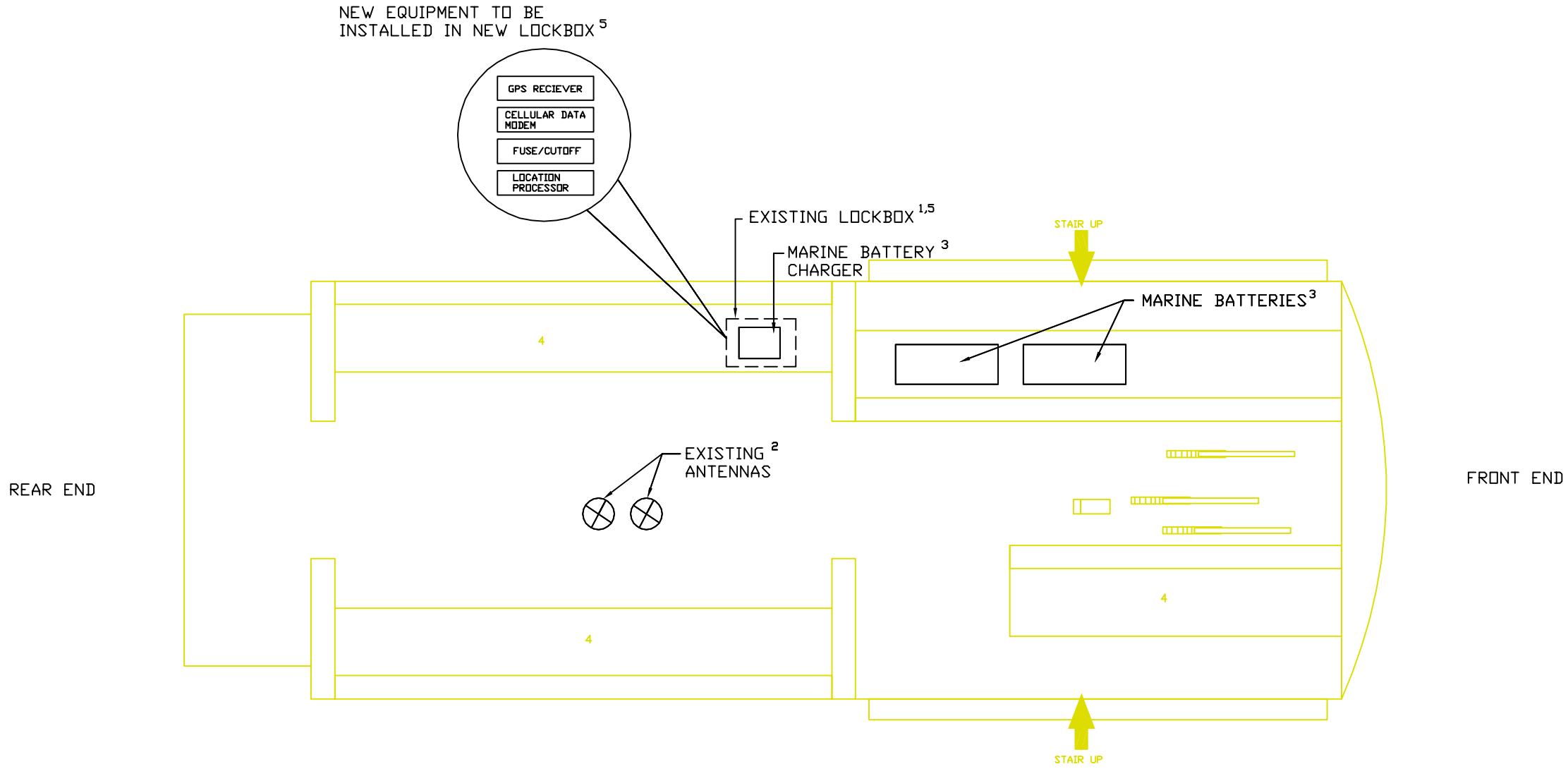
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

CALIFORNIA ST. CABLE CAR PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME-19	REV. 0
SHEET NO. 23	



NOTES:

1. NEXT BUS TRACKER EQUIPMENT LOCATED BELOW CHARGER INSTALLED IN LOCKBOX (APPROX. 8"x12"x4") UNDERNEATH CABLE CAR
2. EXISTING ANTENNA LOCATIONS TO BE DETERMINED
3. EQUIPMENT INSTALLED AND LOCATED UNDER SEATS
4. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
5. EXISTING LOCKBOX TO BE REMOVED AND REPLACED WITH NEW LOCKBOX CONTAINING NEW EQUIPMENT.
6. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
7. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
8. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP REVIEW	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT DATE E 17047 EXP 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

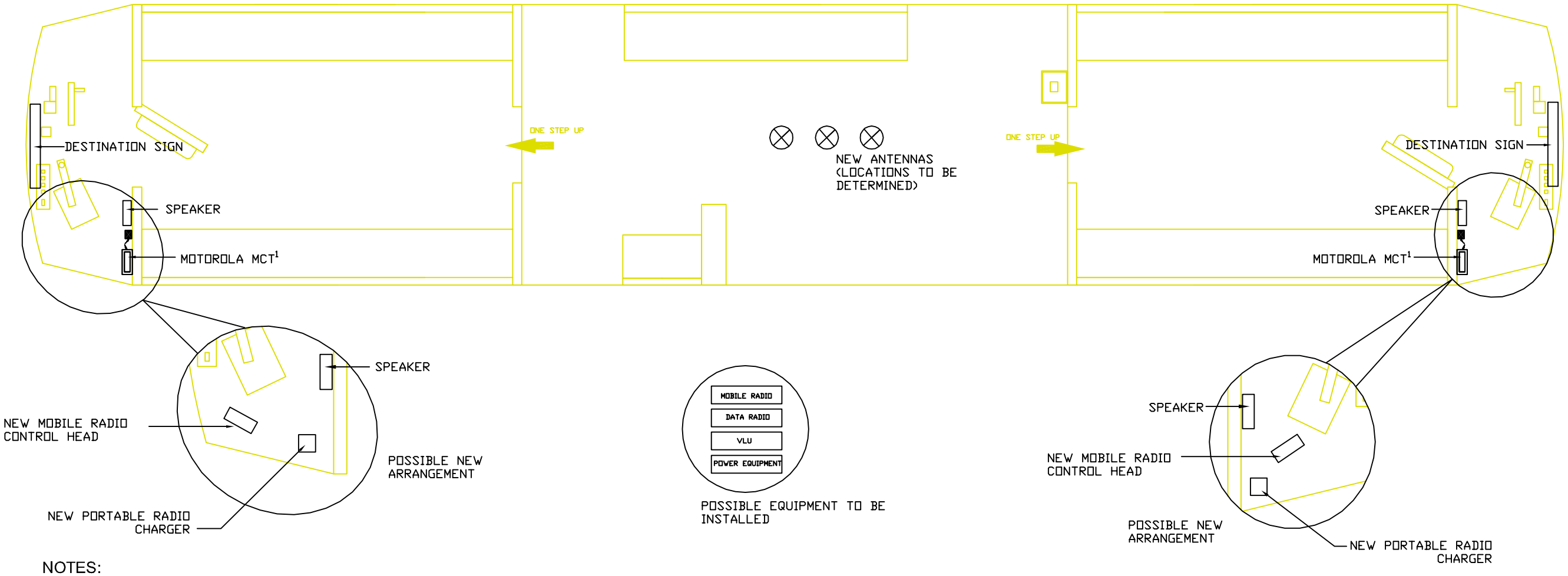
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

1240

POWEL ST. CABLE CAR PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO.	REVISION
ME-18	REV. 0
SHEET NO. 22	



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW EQUIPMENT
2. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
3. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GATE E 17047 5/31/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

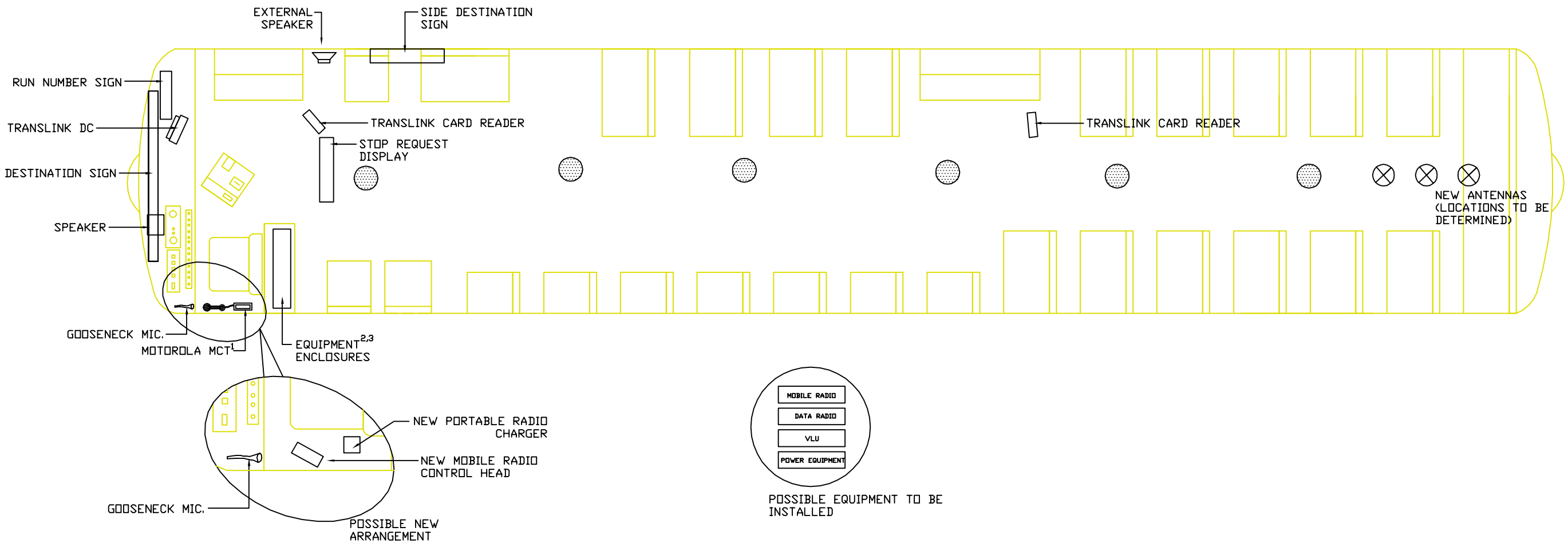
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

MELBOURNE CAR (496) PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME-16	
SHEET NO. 20	REV. 0



NOTES:

1. EXISITING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. POSSIBLE LOCATIONS FOR NEW EQUIPMENT
3. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
4. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
5. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
6. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

INTERIOR SPEAKER

ANTENNA

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAFF E 17047 EXP. 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

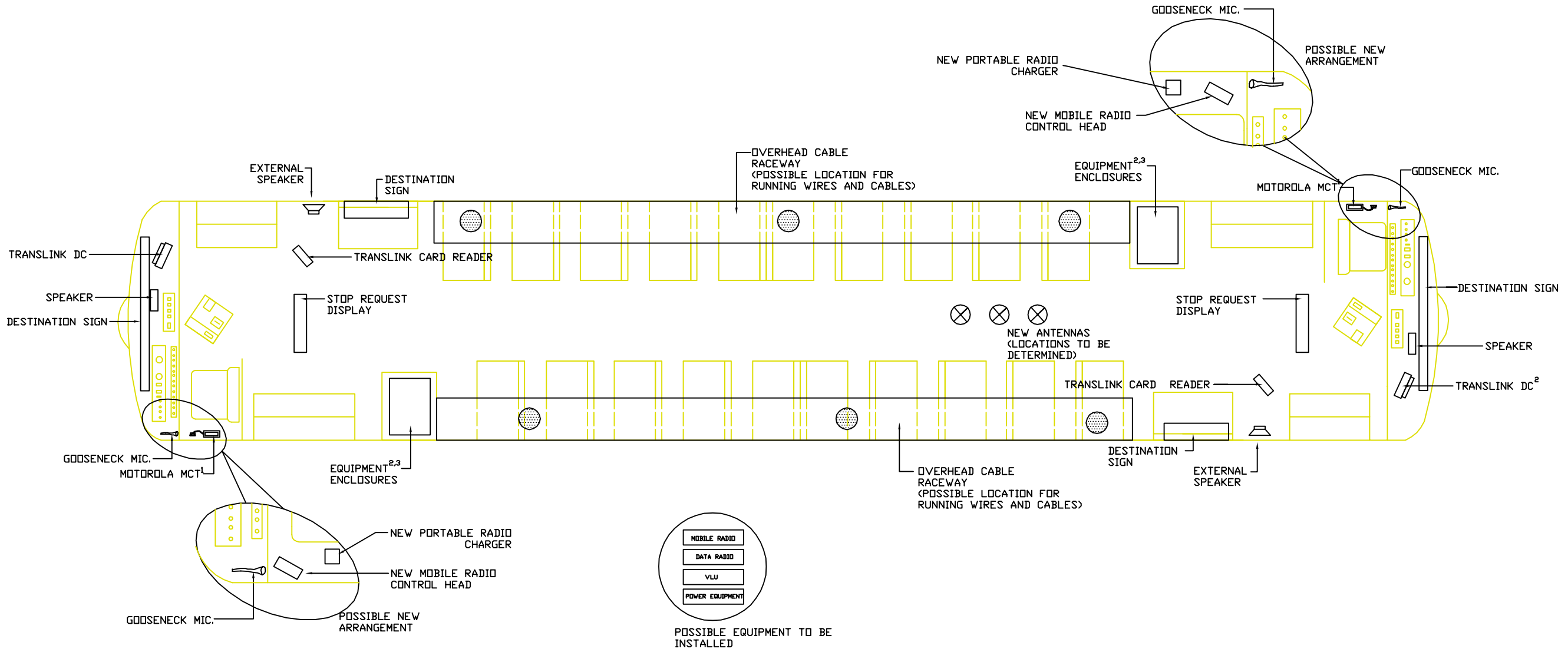
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

PCC (1063) CAR PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. ME-15
SHEET NO. 19
REVISION REV. 0



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. POSSIBLE LOCATIONS FOR NEW EQUIPMENT
3. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
4. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
5. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

INTERIOR SPEAKER

ANTENNA

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAME E 17047 Exp. 3/31/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	10/01/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

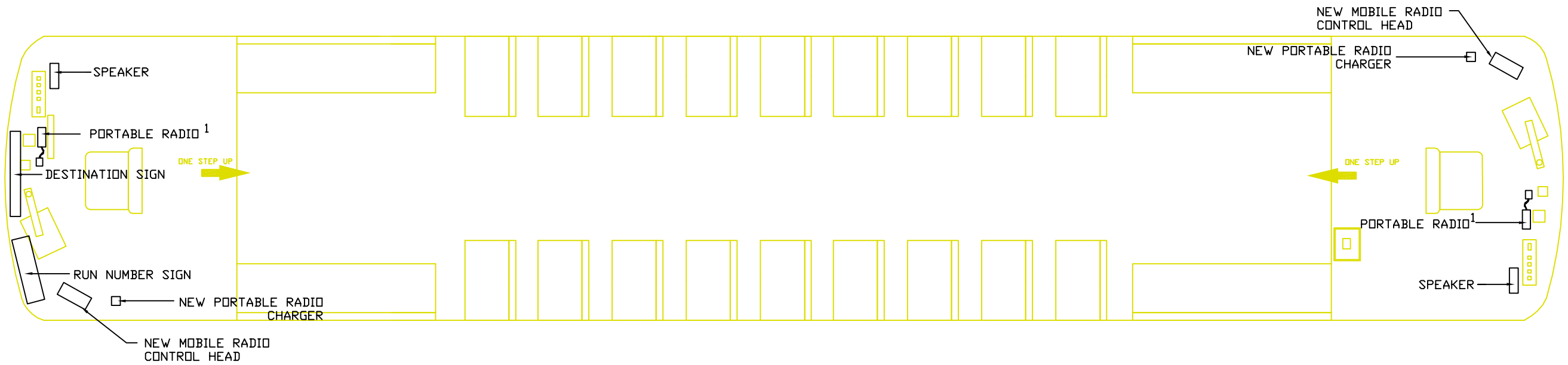
RADIO SYSTEM REPLACEMENT PROJECT

PCC (1015) DOUBLE ENDED CAR PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO. ME-14 | REVISION REV. A

SHEET NO. 18



MOBILE RADIO
DATA RADIO
VLU
POWER EQUIPMENT

POSSIBLE EQUIPMENT TO BE INSTALLED

NOTES:

1. EXISTING PORTABLE RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
2. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JL	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER — ROBERT GAVE — E 17047 — EXP 3/30/11 — ELECTRICAL — STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

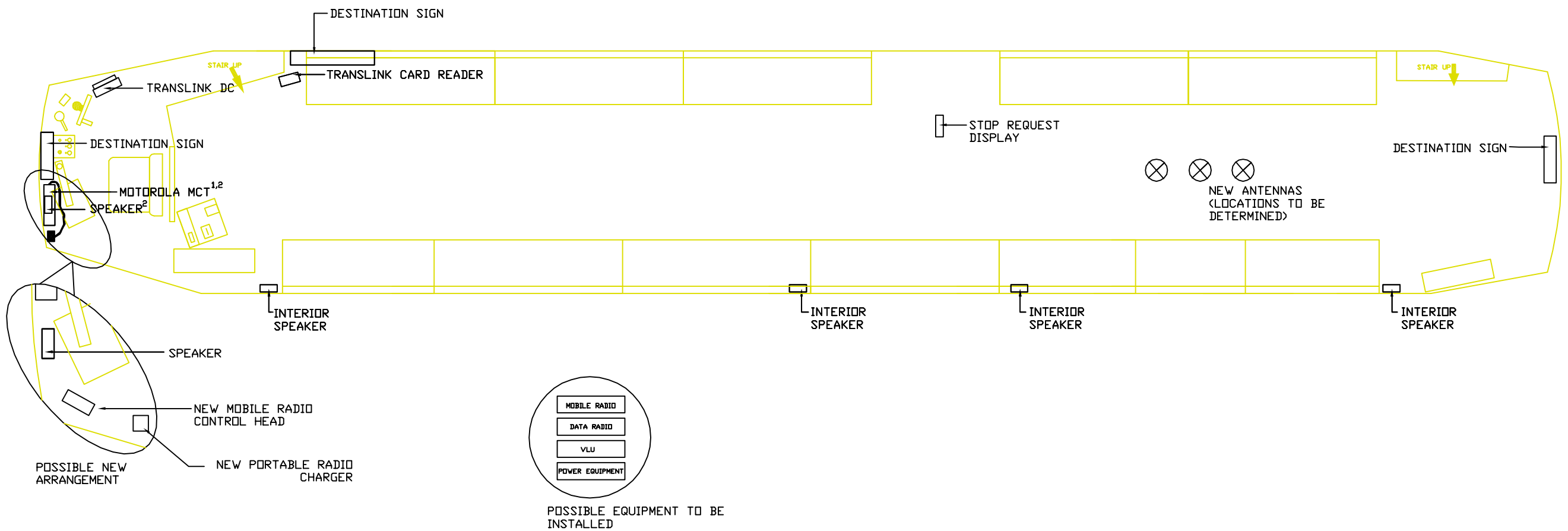
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

NEW ORLEANS CAR (952) PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME–13	REV. 0
SHEET NO. 17	



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. MOTOROLA RADIO AND SPEAKER ARE LOCATED ABOVE THE OPERATORS WINSHIELD
3. TRANSLINK DC MAY REQUIRE RELOCATION
4. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
5. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAFF E 17047 EXP 9/2-11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

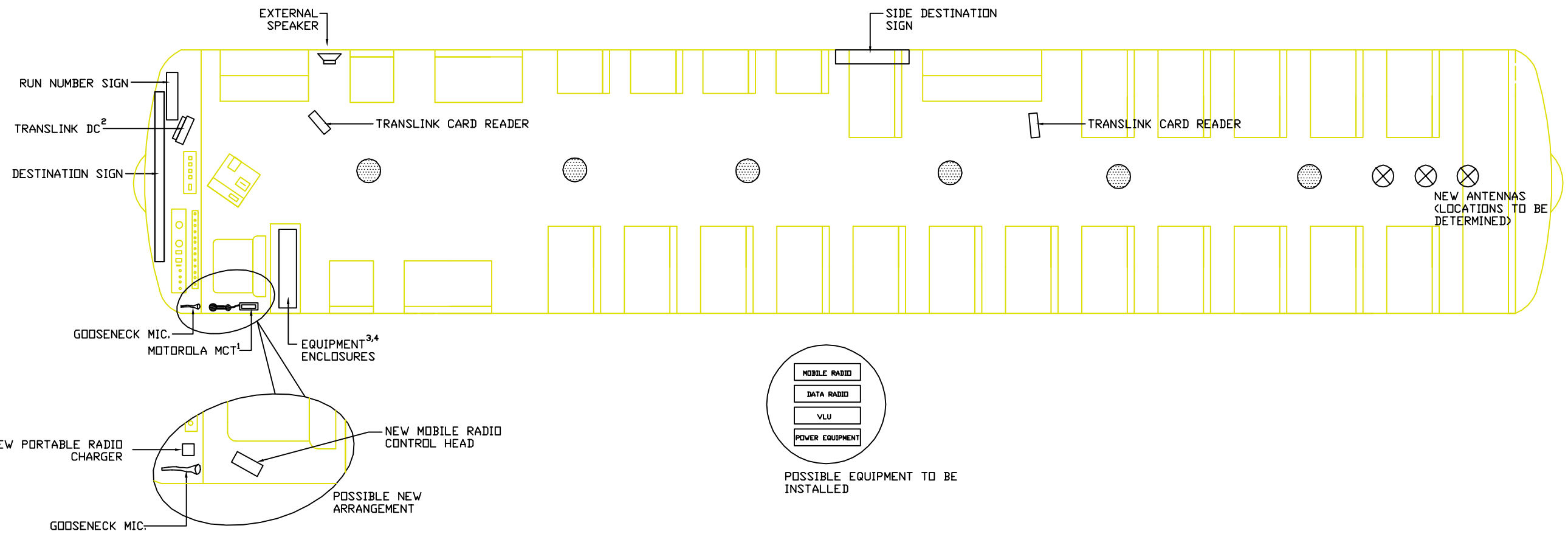
for the EXECUTIVE DIRECTOR / CEO

1240

RADIO SYSTEM REPLACEMENT PROJECT

MILAN CAR (1815) PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

DWG. NO.	REVISION
ME-12	REV. 0
SHEET NO. 16	



NOTES:

1. EXISTING RADIO MAY BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING TRANSLINK DC MAY REQUIRE RELOCATION
3. POSSIBLE LOCATIONS FOR NEW EQUIPMENT
4. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
5. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

LEGEND:

INTERIOR SPEAKER

ANTENNA

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAHL E 17047 EXP 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

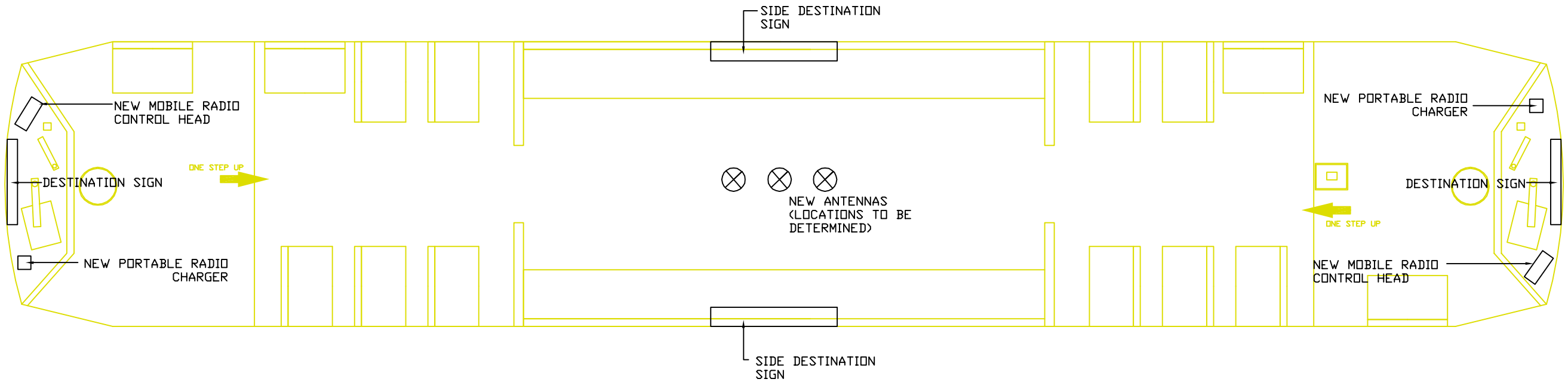
PCC (1070) CAR PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

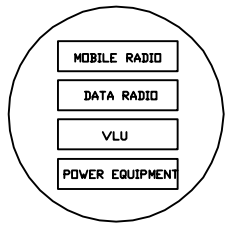
1240

REVISION ME-11

REVISION 15

REVISION REV. 0





POSSIBLE EQUIPMENT TO BE INSTALLED

NOTES:

1. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS
2. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
3. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER — ROBERT GAUF — E 17047 — exp 3/31/11 — ELECTRICAL — STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

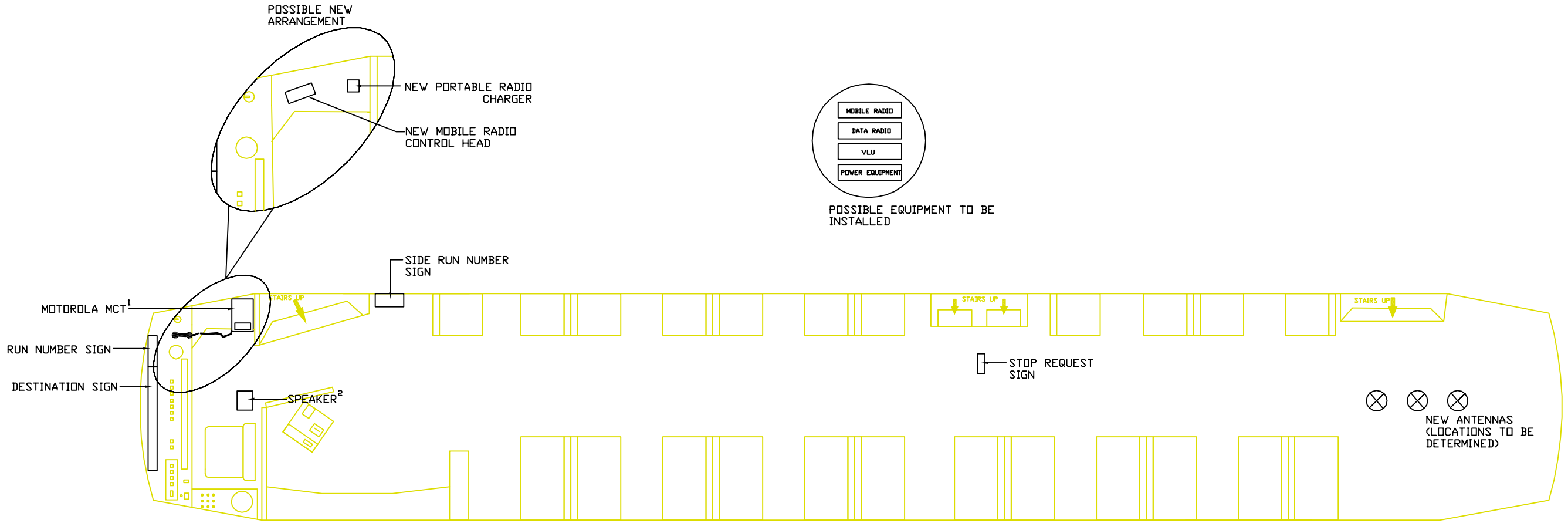
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

HERB CAEN CAR (130 SPECIAL) PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME-10	REV. 0
SHEET NO. 14	



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT
2. EXISTING SPEAKER LOCATED ON THE CEILING OF OPERATOR'S CAB
3. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
5. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	JL	JP	RG

REVISIONS

ROBERT HALE E 17047 EXP 9/30/11 REGISTERED PROFESSIONAL ENGINEER ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. LIO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

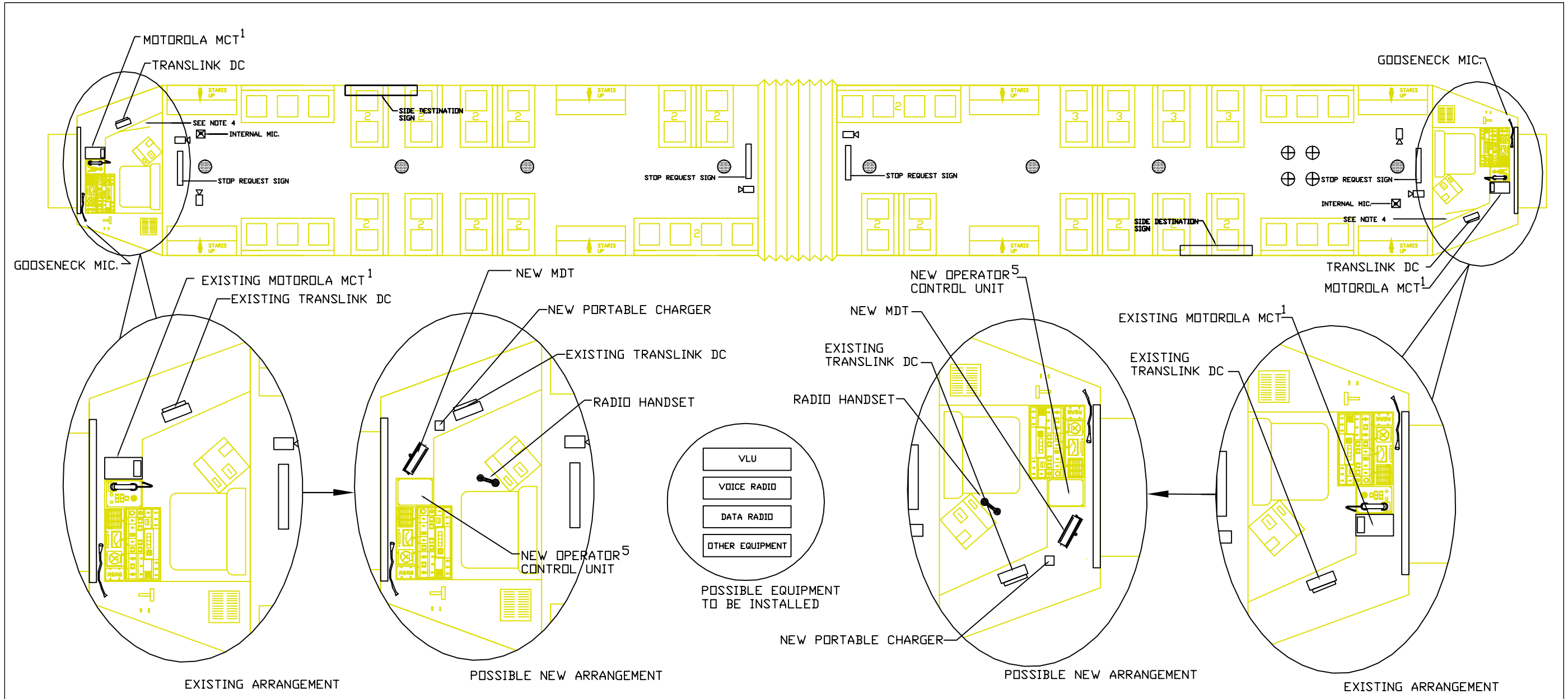
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

ZURICH CAR PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME-09	REV. 0
SHEET NO. 13	



NOTES:

1. EXISTING RADIO WILL BE REPLACED WITH NEW RADIO EQUIPMENT.
2. POSSIBLE EQUIPMENT LOCATIONS UNDER VARIOUS NON-ADA COMPLIANT SEATS.
3. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
4. SOME EQUIPMENT CAN BE INSTALLED IN THE OPERATOR'S CAB COMPARTMENTS (WHERE EXISTING RADIO EQUIPMENT CURRENTLY RESIDES).
5. NEW DIGITAL VOICE ANNOUNCMENT OPERATOR CONTROL UNIT (OPTION).
6. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
7. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS.

LEGEND:

CAMERAS (TWO DIFFERENT MANUFACTURERS)

INTERIOR SPEAKER

ANTENNA (ACTUAL LOCATION TO BE DETERMINED)

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAME E 17047 REG 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. UO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

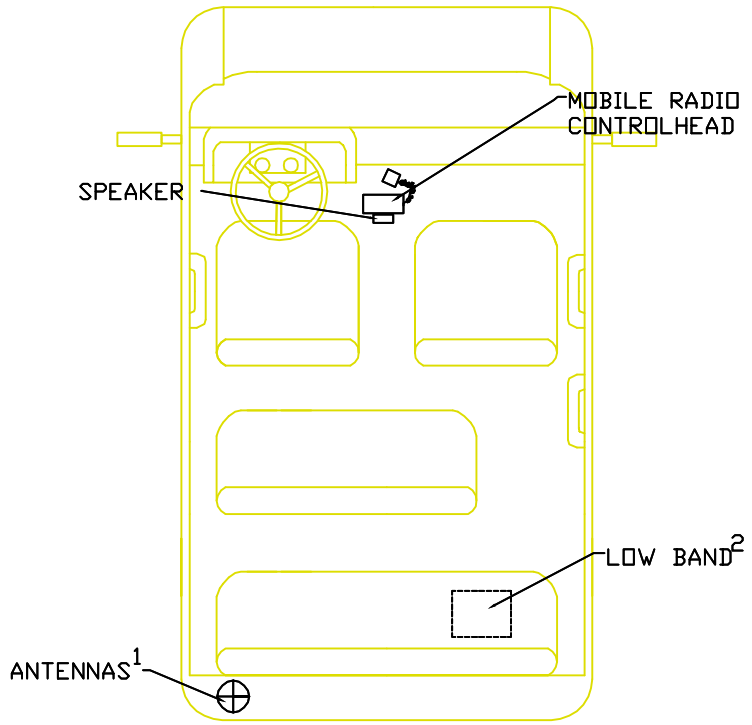
for the EXECUTIVE DIRECTOR / CEO

1240

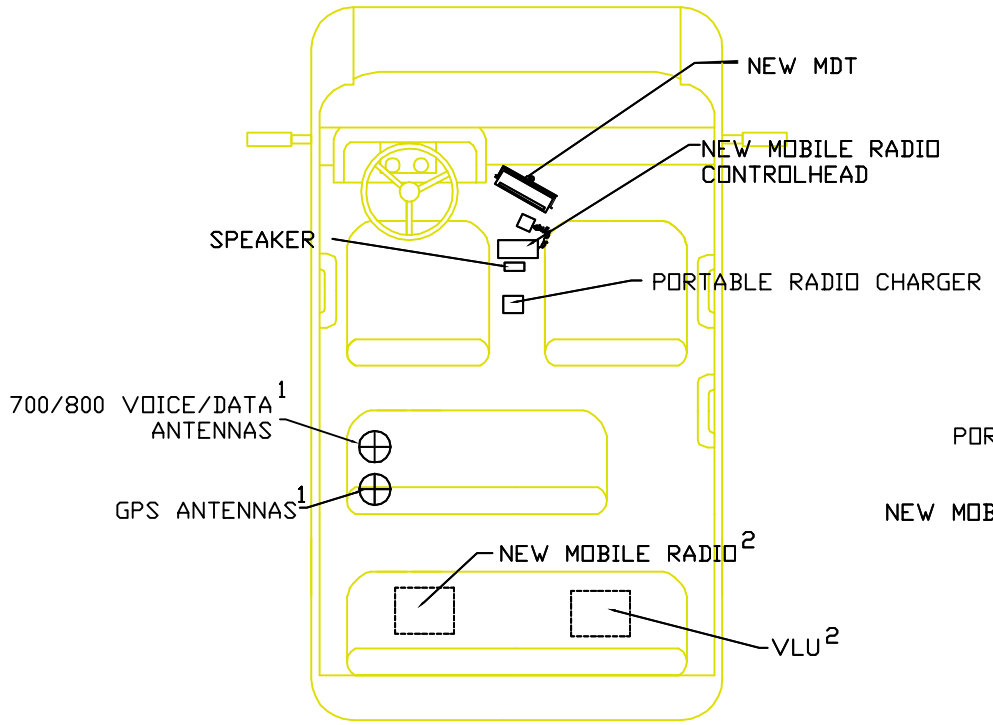
RADIO SYSTEM REPLACEMENT PROJECT

LIGHT RAIL VEHICLE PLAN VIEW
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

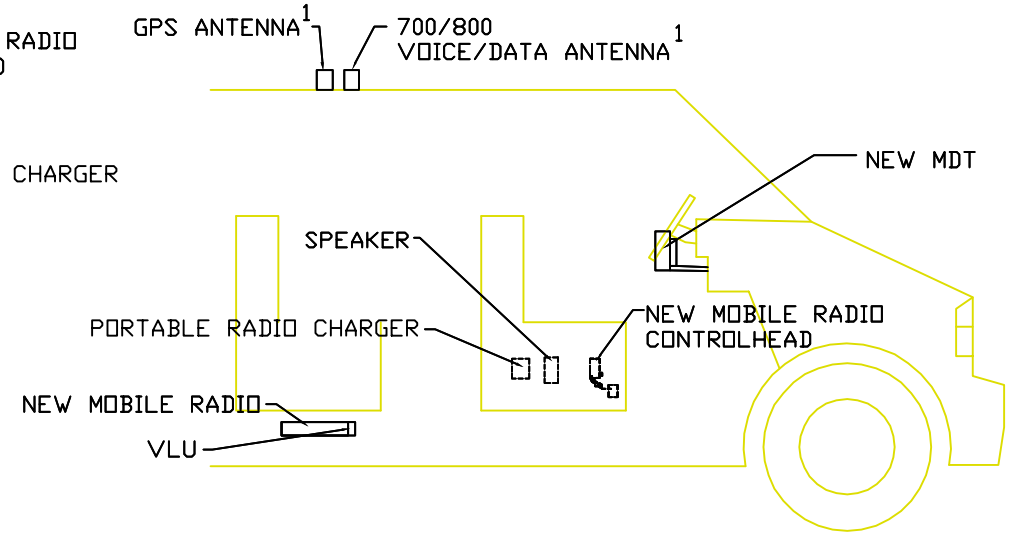
DWG. NO.	REVISION
ME-17	
SHEET NO. 21	REV. 0



EXISTING ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(SIDE VIEW)

NOTES:

1. ANTENNA LOCATIONS TO BE DETERMINED
2. EQUIPMENT INSTALLED UNDER SEAT
3. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
4. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GAURANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
4. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
0	11/18/2009	FOR RFQ/RFP ISSUE		JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GAVE E 17047 EXP. 3/31/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED S. BHANJI
DRAWN J. UO
CHECKED
REVIEWED
RECOMMENDED
APPROVED
DATE 11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

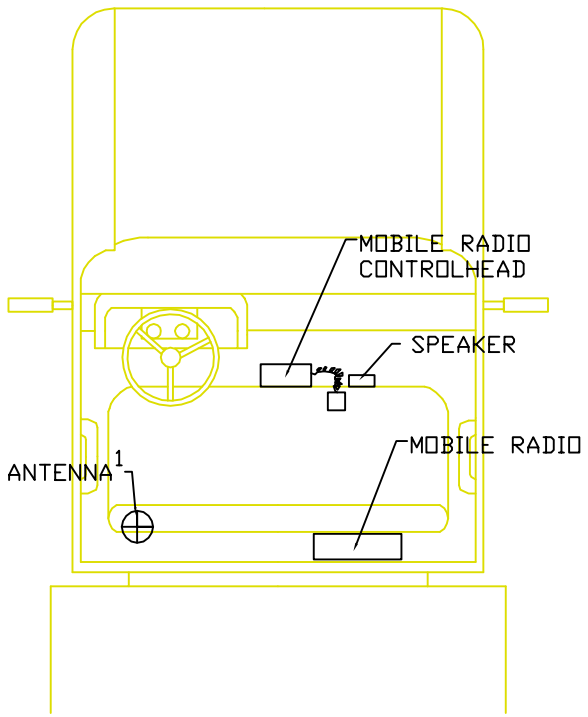
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

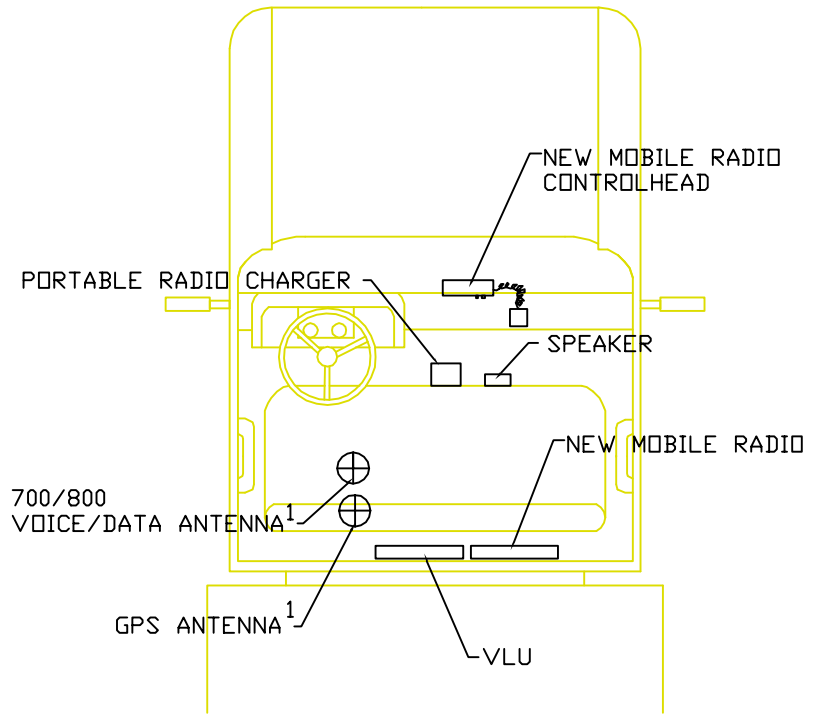
Non-Revenue Vehicle (VAN)
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

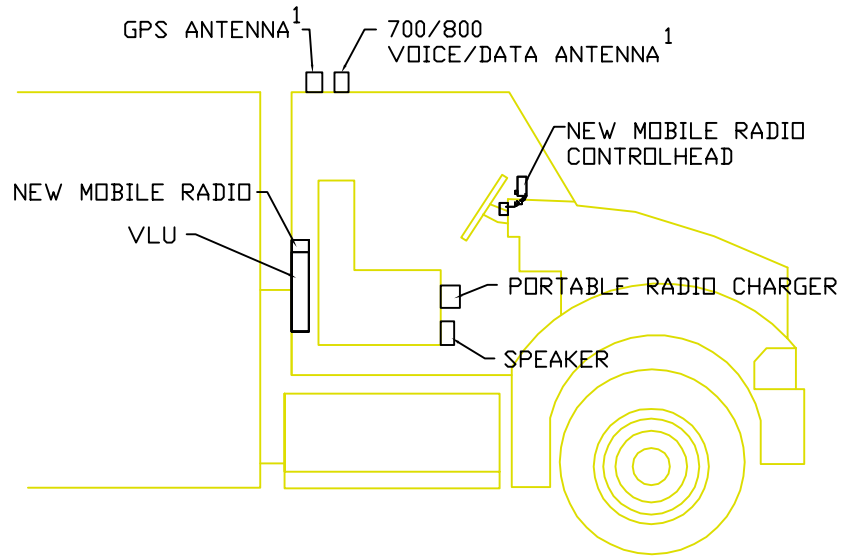
DWG. NO. ME-24
SHEET NO. 27
REVISION REV. 0



EXISTING ARRANGEMENT



PRELIMINARY ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(SIDE VIEW)

NOTES:

1. ANTENNA LOCATIONS TO BE DETERMINED
2. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
3. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
4. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GATE E 17047 EXP 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. UO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

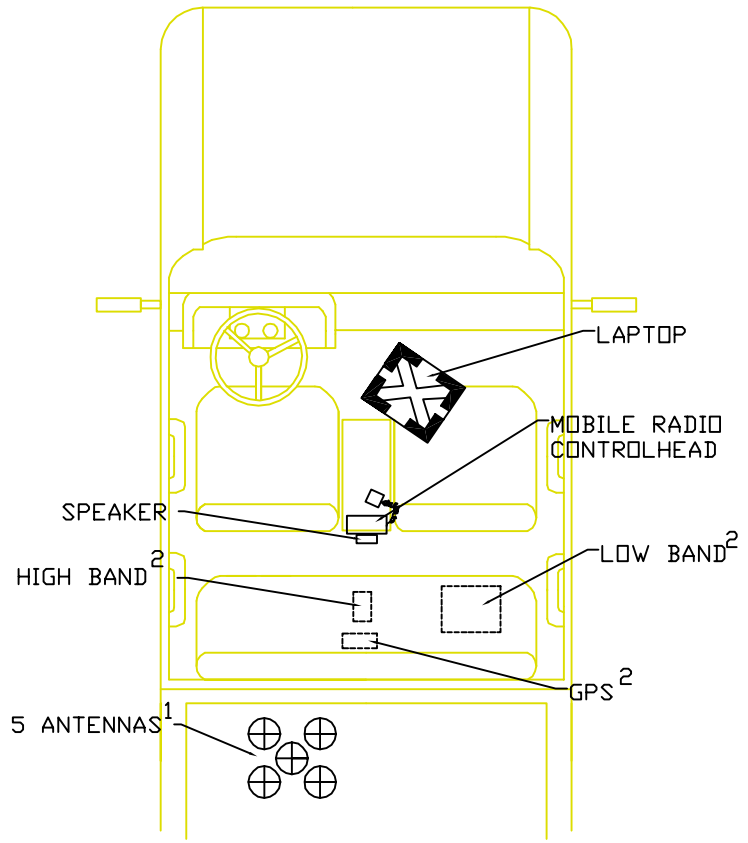
for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

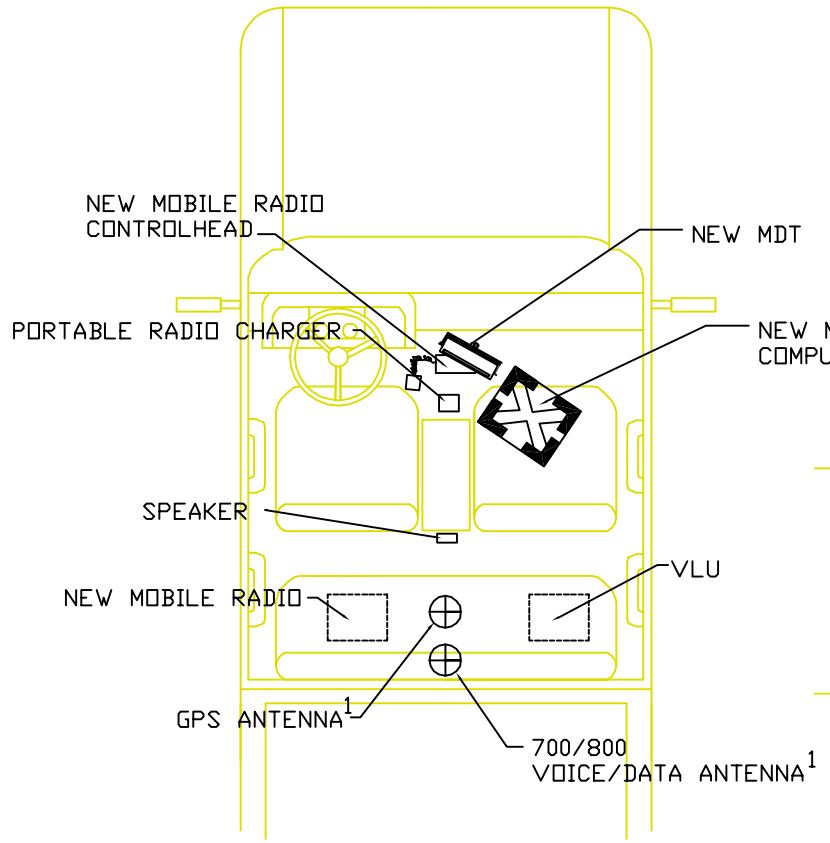
Non-Revenue Vehicle (FREIGHTLINER)
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

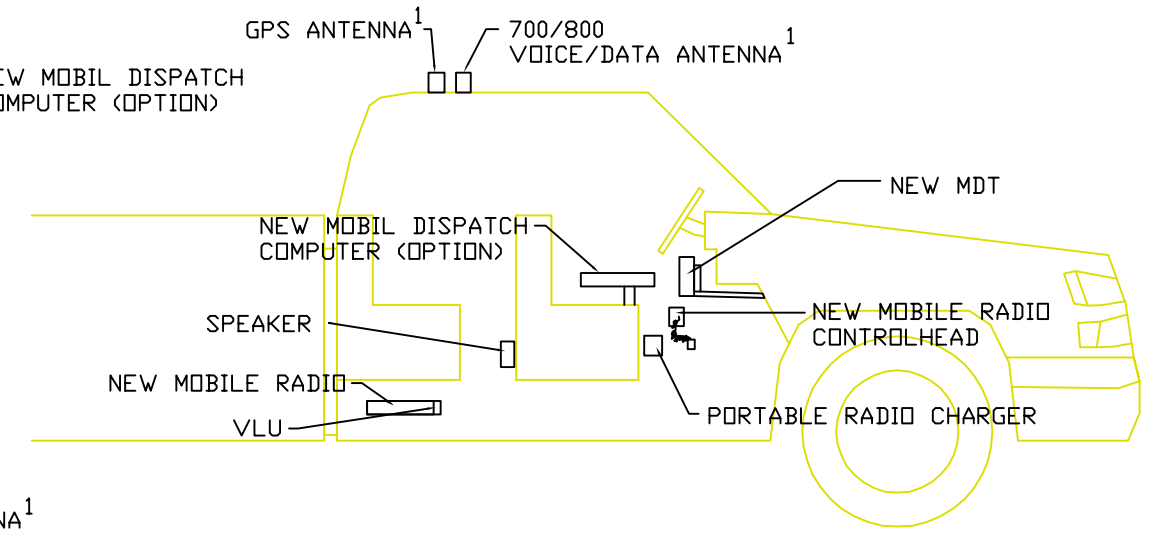
DWG. NO.	REVISION
ME-22	REV. 0
SHEET NO. 26	



EXISTING ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(SIDE VIEW)

NOTES:

1. ANTENNA LOCATIONS TO BE DETERMINED
2. EQUIPMENT INSTALLED UNDER SEAT
3. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
4. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
4. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ALBERT GALE E 17047 EXP. 9/30/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. UO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

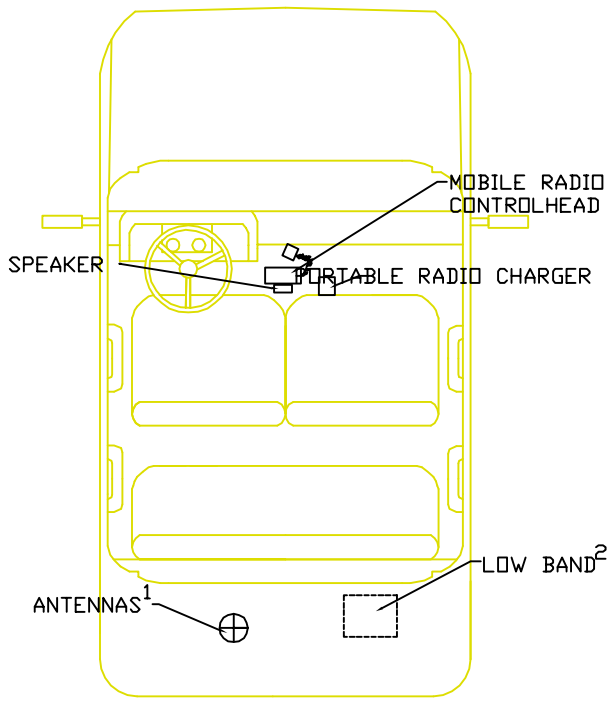
Non-Revenue Vehicle (PICKUP TRUCK)
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

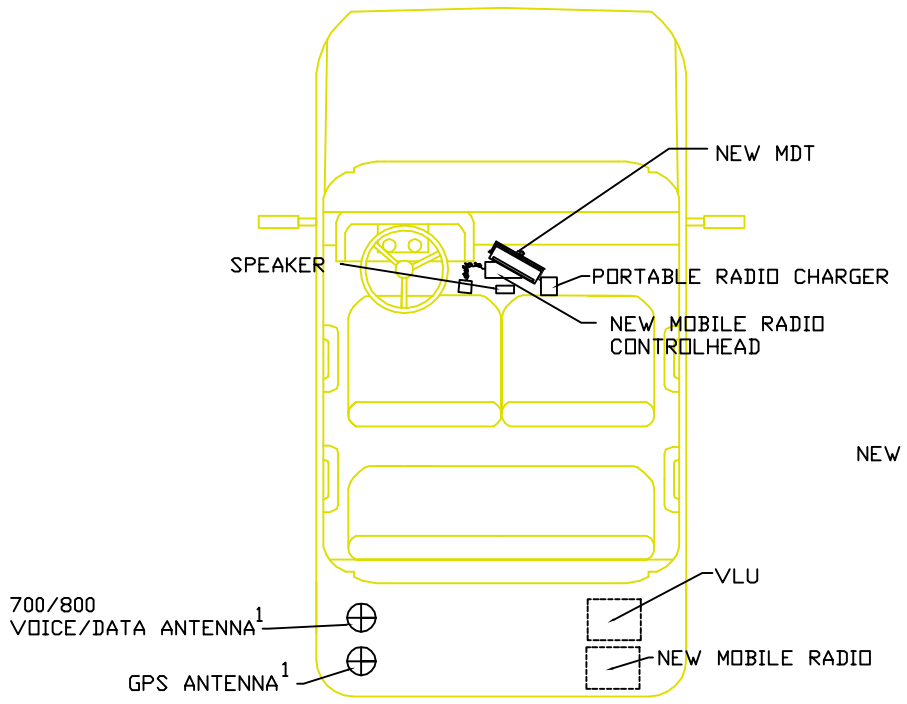
DWG. NO. ME-21

SHEET NO. 25

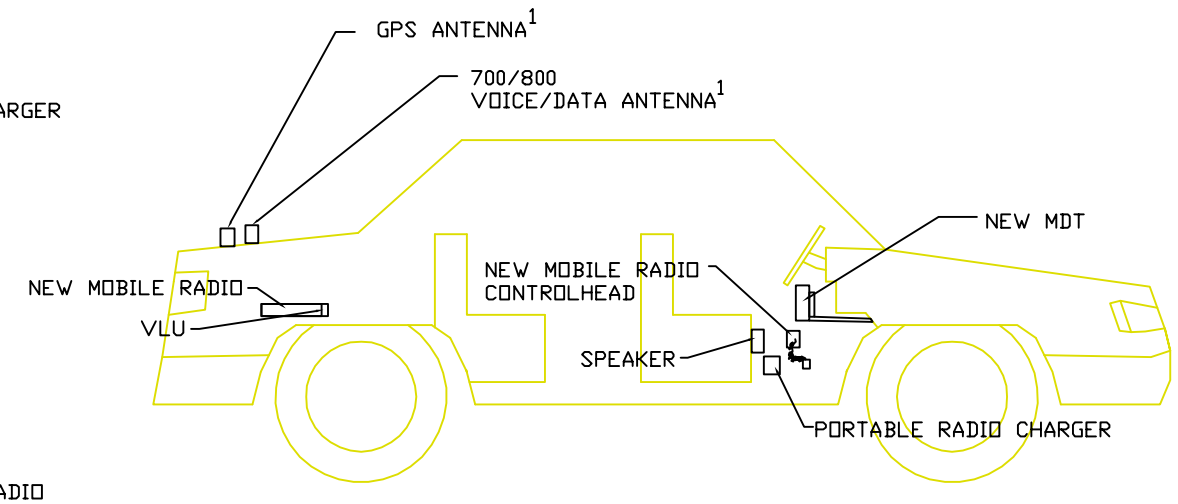
REVISION REV. 0



EXISTING ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(PLAN VIEW)



PRELIMINARY ARRANGEMENT
(SIDE VIEW)

NOTES:

1. ANTENNA LOCATIONS TO BE DETERMINED
2. EQUIPMENT INSTALLED IN TRUNK OF CAR
3. ALL LOCATIONS OF EXISTING EQUIPMENT & AVAILABLE SPACES ARE TYPICAL & APPROXIMATE
4. THE LOCATIONS OF ALL IDENTIFIED EQUIPMENT IS APPROXIMATE. SFMTA DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EQUIPMENT. THE CONTRACTOR SHALL VERIFY ALL EXISTING ASSEMBLIES AND EQUIPMENT.
4. CONTRACTOR TO VERIFY CABLE RUNS AND POWER REQUIREMENTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
A	10/01/2009	FOR RFQ DESIGN REVIEW		JP	RG
0	11/18/2009	FOR RFQ/RFP ISSUE	SB	JP	RG

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ROBERT GALE E 37047 EXP 3/31/11 ELECTRICAL STATE OF CALIFORNIA

DESIGNED	S. BHANJI
DRAWN	J. UO
CHECKED	
REVIEWED	
RECOMMENDED	
APPROVED	
DATE	11/18/2009

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED

for the EXECUTIVE DIRECTOR / CEO

RADIO SYSTEM REPLACEMENT PROJECT

Non-Revenue Vehicle (SEDAN)
(CONCEPTUAL REFERENCE ONLY NOT TO SCALE)
PRELIMINARY NOT FOR CONSTRUCTION

1240

DWG. NO.	REVISION
ME-20	REV. 0
SHEET NO. 24	